



Local Unit READ Guide Template

For the proactive protection of National Park Service resources



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ON THE COVER

Firefighters wrap the historic Merced Grove cabin during the Ferguson Fire in Yosemite National Park.
NPS/Yosemite Fire and Aviation Management Program

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Abstract

A Local Unit Resource Advisor Guide (LURG) is a reference tool developed to promote the rapid and effective protection of sensitive natural and cultural resources, designated lands, and other values within a management unit. A Resource Advisor Atlas is the accompanying geospatial component of the LURG that organizes and communicates data layers and mapping products on resource protection to [Resource Advisors \(READs\)](#), fire personnel, and others. The NPS Local Unit READ Guide Template is presented as an optional job aid to assist in the development of LURGs and READ Atlases.

The LURG identifies values at risk and corresponding resource protection measures (Minimum Impact Strategies and Tactics, management/mitigation requirements, and suppression repair requirements) to inform the avoidance, minimization, or mitigation of impacts to sensitive resources within the context of wildland fire and all-hazard incidents. Resource protection measures may address potential impacts associated with the environmental hazard (e.g., wildfire, flood, etc.) or with the management response to the event (e.g., fire suppression, suppression repair, flooding response, etc.). An updated and readily available LURG at the onset of an incident will assist incident managers in implementing the best strategies to protect the highest value resources within the context of a wide range of competing priorities.

LURGS are developed in advance of an incident, maintained at the local level, and customized to meet the specific needs of the benefiting unit. Their content is concise, well-organized, easily searchable, and designed for efficient use on incidents.

NPS units are encouraged to create LURGs and READ Atlases to inform the protection of resources during wildfire and all-hazard responses. Although there are currently no requirements to follow these guidelines or to produce these products, experience has demonstrated that developing and maintaining these tools, provides the best outcome for the protection of NPS natural, cultural, and other values at risk.

How to Use this Template

- Units are encouraged to create Local Unit Resource Advisor (READ) Guides (LURGs) and READ Atlases tailored to the specific needs of the local unit. The READ Atlas is considered to be a component of the LURG.
- This template is presented as an optional job aid. There are currently no requirements for NPS units to develop LURGs and READ Atlases or to follow these recommendations in developing these products.
- Keep a LURG as concise as possible.
 - Focus on identifying:
 - **WHAT** critical resource values would be at risk during an incident.
 - Specify **WHICH** resources should receive the highest priority for resource protection.
 - Provide guidance as to **HOW** impacts to these resources could be avoided, minimized, or mitigated via resource protection measures/ minimum impact strategies and tactics.
 - In-depth discussions of **WHY** impacts to resources should be addressed via embedded hyperlinks to management plans, policy, supporting documents, etc. rather than extensive text in order to keep your LURG concise.
- Design your LURG for ease of use on incidents.
 - Organize your LURG so that information can be rapidly retrieved, even by responders from outside the local unit.
 - Write to Resource Advisors and fire managers as the primary audience.
- The protection of sensitive information is paramount. LURGs should not contain any sensitive data (including Controlled Unclassified Information). Sensitive data may include, but are not limited to, cultural resource sites, areas of tribal significance, rare plant populations, and endangered species nest locations.
 - Sensitive geographic data may be housed in the READ Atlas if systems have been enabled to effectively protect the distribution of sensitive information.
- Local Unit READ Guides and READ Atlases are intended to be “living documents” which are updated on an annual basis via collaboration among resource managers, fire managers, GIS specialists, Resource Advisors, and others. Lessons learned from incident response should be systematically incorporated into both documents to improve their effectiveness. LURGs are intended to improve over time.
 - If a unit has limited capacity in the initial development of LURGs and READ Atlases, focus on the identification of impact avoidance areas relative to specific

operational actions (retardant avoidance area, no dip/draft zones, no soil disturbance without a READ present, etc.).

- It is strongly recommended that your unit Superintendent, Fire Management Officer, and Resource Management Branch Chief (or equivalent(s)) sign the cover page of the Local Unit READ Guide as an indication of their support and familiarity with its content.

Tips for the Development of READ Guides and READ Atlases

Local Unit READ Guide

- It is important to garner support for the development and maintenance of the LURG/ READ Atlas from unit leadership (Superintendent, Resource Chiefs, FMO, etc.) to prioritize and facilitate engagement in the process.
 - Foster investment and engagement throughout all divisions of local unit management (e.g., Natural Resources, Cultural Resources, Wildland Fire, Maintenance, Interpretation, Wilderness, etc.)
 - Emphasize that the development and maintenance of a LURG presents a container for interdisciplinary collaboration. Immediate and post-fire impacts affect all aspects of park management.
- An effective strategy may be to introduce the concept of LURG development and maintenance within the context of the [Wildland Fire Decision Support System \(WFSS\)](#). It is critical that the language and intent of both products align with each other. WFSS Management Requirements will be general, and the LURG will provide the specifics for how to accomplish these actions.
- Local Unit READ Guides may be added as an appendix to a unit Fire Management Plan (FMP) and be referenced in the Minimum Impact and Strategies and Tactics (MIST) section.
- Some park and fire managers may not be familiar with the utility and practice of wildland fire Resource Advising and may benefit from an introduction to core concepts before being willing to support LURG development. This brief [video](#) outlines the application and use of Resource Advisors on wildfire and all-hazard incidents.
- Identify a single point of contact (e.g., Local Unit READ Coordinator) to coordinate annual pre-season updates to the LURG and management of geospatial data within the READ Atlas.
 - Foster recognition that the LURG/READ Atlas are dynamic planning tools which are iterative in nature. It is especially useful to update LURGs relative to lessons learned following wildland fire incidents.
- If units are challenged with developing a comprehensive LURG/READ Atlas, begin with identifying the highest priority resources for protection and emphasize the designation of conditional avoidance areas (e.g., “no ground disturbance,” “no ground disturbance without a READ present,” “retardant avoidance,” etc.).
- Prioritizing resource values for protection is a critical component of an effective LURG. The determination of priorities is ultimately up to the Superintendent, but relevant specialists should be engaged. Priorities may be informed by a unit’s planning documents and enabling legislation. A facilitated process such as a Quantitative Wildfire Risk Assessment (QWRA) or Incident Strategic Alignment Process (ISAP) can assist in focusing this discussion.

- Refer to this [Library of NPS LURGs](#) to see how other NPS units have created these documents.

READ Atlas

- Unit resource and facility specialists, not the GIS practitioner, should determine what geospatial data to include in the READ Atlas to ensure that READS have the information they need to advise effectively on sensitive resource protection during an incident.
 - Resource and facility specialists lacking a background in resource advising may benefit from reviewing examples of READ Atlases from other units and conferring with local unit READs.
 - When initiating READ Atlas development with local specialists, avoid the temptation of starting off by simply running through the potential READ Atlas content. This laundry list of potential content can be overwhelming and discouraging for units when first developing their Atlas. It is more effective to discuss what is essential to include in the READ Atlas as an open-ended question and follow up later with a look at the potential content list to see if there are other layers to consider.
 - Information overload and map clutter can be problematic for geospatial products. **Make a conscious effort to only include information that is useful and relevant for resource advising.** Discuss with the unit's specialists what information may not be important to include such as lower priority species, infrastructure not at risk, non-essential attribute fields, etc. Use cartographic techniques to de-emphasize less essential information so that essential information is prominent.
- Whenever possible, source the data used in the READ Atlas ArcGIS Pro project directly from the park's GIS to avoid creating duplicate static copies of data which can complicate future Atlas updates. Incorporate new data developed for the Atlas into the park's GIS. Consider implementing data schemas compatible with (or that can be cross walked to) [WFDSS](#) Next Gen spatial data standards. Maintain an inventory of data sources and their stewards.
- Choose a map style for the READ Atlas suited to the information being presented, the likely conditions under which it may be used, the level of sharing that sensitive data stewards are comfortable with, and the unit's ability to maintain it.
 - Some units combine cultural and natural resource information on one map while others create separate maps. Units prone to loss of connectivity during incidents may prefer a printable Atlas. Units with a high density of resources and assets to protect may prefer an Atlas that is zoomable with features that are clickable (e.g., mobile map package and/or web map). The READ Atlas can be produced in more than one style. The pros and cons of different map options are covered in greater detail in Appendix F of this document.

Maintaining READ Guides and READ Atlases

- Prior to each fire season, the Local Unit READ Coordinator should send out a scoping email to local unit resource specialists and division leads inquiring about new inputs or changes to the Local Unit READ Guide and READ Atlas.
- A few months prior to fire season, local unit fire managers, resource specialists, and other division leads should meet to discuss updates to values prioritization, WFDSS, the Local Unit READ Guide, and the READ Atlas.
- The Local Unit READ Coordinator or READ Atlas Data Manager should maintain a detailed standard operating procedures document which informs how to use, share, update, and maintain the READ Atlas. This document can be developed as an appendix to the LURG.
- The Local Unit READ Coordinator should conduct After Action Reviews (AARs) following incidents to improve LURG/READ Atlas content, usability, and implementation.

1. Introduction

1.1 Local Unit READ Guide: Purpose and Needs Statement

A Local Unit READ Guide (LURG) is a reference tool developed to promote the rapid and effective protection of sensitive natural and cultural resources, designated lands, and other values within a management unit. A READ Atlas is the accompanying geospatial component of the LURG that organizes and communicates data layers and mapping products on resource protection to READs, fire personnel, and others.

The LURG identifies values at risk and corresponding resource protection measures (Minimum Impact Strategies and Tactics, management/mitigation requirements, and suppression repair requirements) to inform the avoidance, minimization, or mitigation of impacts to sensitive resources within the context of wildland fire and all-hazard incidents. Resource protection measures may address potential impacts associated with the environmental hazard (e.g., wildfire, flood, etc.) or with the management response to the event (e.g., fire suppression, suppression repair, flooding response, etc.).

LURGS are developed in advance of an incident, maintained at the local level, and customized to meet the specific needs of the benefiting unit. Their content is concise, well-organized, easily searchable, and designed for efficient use on incidents. Embedded hyperlinks direct users to supportive information and policy. [Resource Advisors](#) (READs) and fire managers are the primary intended audience for the LURG.

An updated and readily available LURG at the onset of an incident will assist incident managers in implementing the best strategies to protect the highest value resources within the context of a wide range of competing priorities. Oftentimes, lesser valued resources may need to be impacted in order to protect higher valued priorities.

A READ Atlas is the accompanying geospatial component of the LURG that organizes and communicates data layers and mapping products on resource protection to READs, fire personnel, and others. The intent of a READ Atlas is to provide a map (or set of maps) and geospatial data of a unit's sensitive natural and cultural resources, specially designated lands, infrastructure, and utilities to inform how to protect them (e.g., "no dip" lakes) via resource advising on incidents.

Development of a LURG is a collaborative process. Contributions from resource managers, fire managers, facility managers, and GIS specialists are all needed. As a secondary benefit, the process of developing and maintaining a LURG fosters opportunities for regular discussion of protection prioritization, management strategy, and response coordination among emergency responders and resource specialists during both wildland fire and all-hazard incidents.

Resource Protection Measures (RPMs), which constitute the core of READ messaging to firefighters, incident management teams, and agency administrators, may be drawn from a variety of sources including (but not limited to) law, policy, regulation, [fire management plans \(FMPs\)](#), Wildland Fire

Decision Support System Management Requirements, accepted best management practices, and NEPA documents (Environmental Assessments (EA), Finding of No Significant Impact (FONSI), Environmental Impact Statements (EIS) and Record of Decisions (ROD)).

Content within Local Unit READ Guides and READ Atlases must accurately reflect policy requirements inherent in management plans and NEPA decisions. They must also be congruent with (and may be incorporated into) other planning products such as emergency response plans, fire management plans, the Wildland Fire Decision Support System (WFDSS), and the Incident Strategic Alignment Process (ISAP).

This LURG template, and its corresponding [reference library](#) is intended as a job aid to encourage and assist NPS units in the development of LURGs in advance of incidents with the goal of reducing risk to sensitive resources and values.

1.2 How to Use the LURG/ READ Atlas on an Incident

- Step 1: Identify the location of the incident and its anticipated geographic scope relative to the operational response (e.g., fire/ environmental hazard planning area),
- Step 2: Confer with the READ Atlas to identify known resource values and/or pre-identified resource protection measures like avoidance areas within the fire/ environmental hazard planning area. Cross-reference with the LURG to identify recommended resource protection measures.
- Step 3: Develop an incident-specific [Incident READ Guide \(IRG\)](#) to communicate values at risk and advised resource protection measures (MIST) within the fire planning area to incident managers, operational personnel, and Resource Advisors. Confer with local resource specialists to ensure that guidance is accurate and appropriate.
- Step 4: Develop geo-spatial mapping products (paper maps and/or digital applications) to communicate the presence of sensitive resources.
 - Note: The protection of geographic information associated with certain sensitive resources is paramount. The content and/or degree of specificity displayed in mapping products may differ between products developed for READs and other users. Label products according to [DOI CUI requirements](#).
- Step 5: This process is iterative. As the incident expands, both the Incident READ Guide and mapping products will need to be periodically updated to address changes in tactics and scope.

1.3 Overview and Unit-Specific Information

Content in this section of the LURG informs a general overview of the unit and identifies information critical to the protection of sensitive resource values at risk. In order to keep the LURG concise, hyperlink supplemental information to the greatest degree possible.

Potential content may include:

- Brief description of park purpose, significance, and fundamental resources and values. These points can be easily identified in the Park's [Foundation Document](#).
 - Provide unit overview map
- Overview of significant unit features, landmarks, critical structures, roads, trails, wilderness, and designated lands.
 - Provide accompanying map
- Brief description of dominant vegetation types
 - Provide accompanying map
- Jurisdictional Map
 - Provide accompanying map
- Overview of unit-specific fire management/emergency response standards and conventions
 - Identification of Fire Management Units (FMUs) or Spatial Fire Planning Units (SFPU) and associated fire management considerations including WFDSS Strategic objectives.
 - Links to fire management, resource management, and emergency response plans.
- [Matrix of suppression actions requiring superintendent approval \(optional\)](#)

1.4 Local Unit READ Protocols

Potential content may include description of:

- Link to Local Unit READ Drive ([NOCA READ Drive Example](#))
- Local Unit READ Roster
- On Call READ Calander
- [REAC/READ/REAF/ARCH Roles & Responsibilities](#)
- Unit-Specific READ Protocols
 - Incident READ Response Protocols
 - READ Safety Standards/Protocols
 - Protection of Sensitive Data Protocols
 - READ Trainee Protocols
 - Designated READ Flagging Color Scheme
 - READ Reporting Requirements
 - [Incident READ Report](#)
 - [Incident READ Drive Template](#)

- Unit-specific Documentation of Operational Actions (as required)
 - Retardant drops (volume, location, date, etc.)
 - Flight hours/ landings/ deliveries in Wilderness: UAS/helicopters
 - Wilderness spike camp locations, duration, number of firefighters
 - Etc.
- READ Equipment Cache
 - Location and contents
 - READ mobile device protocols
- Notification Requirements
 - Endangered Species Act (ESA)
 - US Fish & Wildlife Service (FWS)
 - National Marine Fisheries Service (NMFS)
 - State Historic Preservation Officer (SHPO)
 - Tribal Consultation
 - Tribal Historic Preservation Officer (THPO)
 - Inadvertent Discovery of Human Remains (Law Enforcement, THPO and/or Coroner)

1.5 READ Atlas

Potential content may include:

- Information on the purpose and intent of a READ Atlas
- Link to unit Protected Data Memo
- [Link to NPS READ Atlas Job Aid](#)

1.5.1 Intent of a READ Atlas

The intent of a READ Atlas is to provide a map (or set of maps) and geospatial data of a unit's sensitive natural and cultural resources, specially designated lands, infrastructure, and utilities to inform how to protect them (e.g., "no dip" lakes) via resource advising on incidents. READ maps and data should be staged in a secure manner to safeguard sensitive information and make these products efficient to deploy to intended end users: qualified READs, REAFs, or ARCHs assigned to an incident. Non-sensitive maps and datasets in a READ Atlas may be used by operational personnel, fire planners, incident qualified GISSs, and others as appropriate.

1.5.2 Importance of Managing Sensitive Data

A READ Atlas may contain protected, confidential, or sensitive data, which must be managed appropriately and protected from unauthorized access or release. Safeguarding sensitive data requires

compliance with law, policy, and internal guidance. Such safeguards involve establishing trust with sensitive data stewards so that the READ Atlas can include a comprehensive scope of spatial information which can be provided to those who require access to it, oftentimes on short notice.

Sensitive data includes legally protected data, but the scope is broader than that. The NPS does not define “sensitive” data per se but does allow data to be protected from release when doing so will result in harm, theft, or destruction of the resource (Draft RM 66B; NPS 2010). In 2019-2020, NPS Inventory & Monitoring Networks assisted parks with creating a “Protected Data Memo” for superintendent approval and signature which documented decisions about what datasets were non-public and should be withheld from release to protect resources. These memos include a written standard confidentiality agreement and disclaimer that should be part of any transmittal of a protected dataset.

DOI frames sensitive information as either classified or [Controlled Unclassified Information \(CUI\)](#). The [CUI registry](#) includes general and protected critical infrastructure information, archeological resources, and national park system resources and describes uniform requirements for marking documents that contain this information ([Executive Order 13556](#) and [32 CFR § 2002](#)).

Laws that require the confidentiality of certain information and specify the conditions under which that information may be released include:

- Migratory Bird Treaty Act (1918)
- National Historic Preservation Act (1966): [16 U.S.C. § 470w-3](#), allows an agency to withhold information about the location, character, or ownership of certain historic resources under certain circumstances. This law also identifies conditions under which the Secretary may release this information.
- Endangered Species Act (1973)
- Privacy Act (1974)
- Archaeological Resources Protection Act (1979): [16 U.S.C. § 470hh](#) prohibits the release, under FOIA or any other law, of information concerning the nature and location of certain archeological resources. This law also identifies conditions under which the Secretary may release this information.
- Federal Cave Resources Protection Act (1988): [16 U.S.C. § 4304](#), prohibits making information concerning the specific location of any significant cave available under FOIA except under certain circumstances. “Significant caves” are identified by the DOI Secretary; this list is updated periodically ([16 U.S.C. § 4303](#)).
- Native American Graves Protection and Repatriation Act (1990); 25 U.S.C 3001 et seq, and the 2024 implementing regulations (43 CFR part 10) address the protection, repatriation and disposition of Native American human remains, funerary objects, sacred objects, and objects

of cultural patrimony to lineal descendants, Federally Recognized Tribes, and Native Hawaiian organizations.

- National Parks Omnibus Management Act (1998): Section 207, [16 U.S.C. § 5937](#), allows NPS to withhold information regarding the nature and specific location of certain cultural and natural resources in the national park system from release under FOIA. The law also identifies conditions under which the Secretary may release this information. Information concerning the nature and specific location of a National Park System resource which is endangered, threatened, rare, or commercially valuable, of mineral or paleontological objects within units of the National Park System, or of objects of cultural patrimony within units of the National Park System, may be withheld from the public ([16 U.S.C. § 5937](#)).
- Protection of Indian Sacred Sites [Executive Order No. 130007](#) (1996): instructs agencies to accommodate access to and ceremonial use of Indian sacred sites on federal land by Indian religious practitioners, avoid adversely affecting the physical integrity of such sacred sites, and maintain the confidentiality of those sacred sites, where appropriate.
- Homeland Security Act (2002): specifically mentions the government’s need to protect critical infrastructure information, referenced as “critical systems, facilities, stockpiles, and other assets from security breaches and harm.”

No personally identifiable information (PII), CUI, sensitive data, or data that could be considered sensitive are permitted on the [NIFC ArcGIS Online](#) (AGOL) organization, regardless of any local decision about sharing that information ([Rules of Behavior and Publishing Guidelines; NIFC 2023](#)).

A READ Atlas containing sensitive data may not be published or hosted on the NIFC AGOL to be used in Field Maps or any web map, web app, group, or account, regardless of the sharing status of those items. Sensitive data are allowed in [NPS Portal](#), but use of Portal is limited to DOI only ([Acceptable Use Policy; NPS 2023](#)) (Rules of Behavior and Publishing Guidelines; NIFC AGOL 2023). However, password protected, side-loaded mobile map packages containing sensitive data may be deemed acceptable for use by appropriate personnel in Field Maps on an incident.

1.6 Contact List

Potential content may include contact information for:

- Local/Zoned READ Coordinator
- Local Unit Resource Specialists by discipline
- Local Unit Fire Staff
- Local Unit Superintendent
- Neighboring jurisdictions READ POCs
- Local Stakeholders POCs
 - Special use permittees and managers

- Tribal contacts
- Regional READ Coordinator
- Local/Regional BAER Coordinator

Consider developing this contact list as an appendix to the LURG as it will need to be updated annually.

2. Natural Resources

2.1 Natural Resources: Broadscale Unit-Level Priorities

This section of the LURG identifies natural resources within the unit deemed to have the highest priority for protection and provides a brief rationale for their prioritized protection. Additional supporting information (e.g., management plans, policy, supporting documents, etc.) may be added through hyperlinks. Ensure that no sensitive data is shared in this section and clarify how sensitive data should be identified, stored, and distributed amongst incident personnel.

Natural resources should be prioritized by an interdisciplinary team led by natural resources staff and local unit READs so that crews can most effectively direct operations to protect, minimize, or avoid sites that could be adversely affected by incident operations. Natural resource priorities are determined prior to an incident by examining natural resource types, their significance, and their sensitivity. Protection prioritization assists incident management teams, managers, natural resources staff, and REAFs in focusing treatment efforts and increasing work efficiencies.

2.2 Natural Resources: Values and Resource Protection Measures

This section identifies natural resource values for consideration and advised resource protection measures (RPMs) to protect the values from potential impacts associated with the environmental hazard and the operational response.

Refer to [Appendix A. Catalog of Natural Resource Protection Measures](#) at the end of this document for examples of natural resource values to consider for inclusion into the LURG and examples of advisory language commonly employed RPMs. This catalog follows an “everything and the kitchen sink” approach in which suggested content is presented as a picklist which units can choose to adopt (or not) relative to their specific needs.

3. Cultural Resources

3.1 Cultural Resources: Broadscale Unit-Level Priorities

This section of the LURG identifies cultural resources, as defined in [NPS 28](#), within the unit, identifies cultural resource vulnerability to fire and other environmental hazards, identifies operational actions bearing the potential to adversely affect cultural resources and provides a brief rationale for the prioritized protection of cultural resource sites within the unit. Additional supporting information (e.g., management plans, policy, supporting documents, etc.) may be added through hyperlinks. Ensure that no sensitive data is shared in this section and clarify how sensitive data should be identified, stored, and distributed amongst incident personnel.

Cultural resources should be prioritized by an interdisciplinary team led by cultural resources staff and ARCHs so that crews can most effectively direct operations to protect, minimize, or avoid cultural resources that could be adversely affected by incident operations. Cultural resource priorities are determined prior to an incident by examining cultural resource types, their significance, and their sensitivity to understand the vulnerability of the resource. Protection prioritization assists incident management teams, managers, cultural staff, and ARCHs in focusing treatment efforts and increasing work efficiencies. Refer to Appendix B. Additional References for Cultural Resources for guidance on setting unit-level priorities.

3.2 Cultural Resources: Values and Resource Protection Measures

This section identifies cultural resource values for consideration and makes recommendations for resource protection measures (RPMs) to protect these values from potential impacts associated with the environmental hazard and the operational response during an incident. [Appendix B. Additional References for Cultural Resources](#) at the end of this document identifies considerations and strategies for the protection of cultural resource values.

4. Museum Collections

4.1 Museum Collections: Broadscale Unit-Level Priorities

This section of the LURG identifies museum collections within the unit deemed to have the highest priority for protection and provides a brief rationale. Additional supporting information (e.g., museum management plans, policy, supporting documents, etc.) may be added through hyperlinks. Ensure that no sensitive data is shared in this section and clarify how sensitive data should be identified, stored, and distributed amongst incident personnel.

4.2 Museum Collections: Values and Resource Protection Measures

This section identifies systematic protocols for the protection of museum collections from potential impacts associated with both the environmental hazard and the operational response. [Appendix C. Additional References for Museum Collections](#) at the end of this document identifies considerations and strategies for the protection of cultural resource values including an outline for the development of a Museum Collection Emergency Response Plan.

5. Tribal Interests and Traditionally Associated Communities

5.1 Tribal Interests: Broadscale Unit-Level Priorities

This section identifies responsibilities and measures regarding consultation and communication with Tribal partners. Ensure that no sensitive data (as identified by the Tribe or Tribes) is shared in this section and clarify how Tribally sensitive data should be identified, stored, and distributed amongst incident personnel.

5.2 Tribal Interests: Values and Resource Protection Measures

This section identifies considerations for the protection of Tribal values from potential impacts associated with the environmental hazard and the operational response. [Appendix D. Additional References for Tribal Interests](#) at the end of this document identifies considerations and strategies for the protection of Tribal values.

6. Designated Lands

6.1 Designated Lands: Broadscale Unit-Level Priorities

This section identifies those designated lands within the unit (e.g., Designated Wilderness, Wild and Scenic Rivers) and provides a brief rationale for their protection. Additional supporting information (e.g., management plans, policy, supporting documents, etc.) may be added through hyperlinks. Ensure that no sensitive data are shared in this section and clarify how sensitive data should be identified, stored, and distributed amongst incident personnel.

6.2 Specially Designated Lands: Resource Protection Measures

This section identifies general strategies and specific resource protection measures (RPMs) to protect local designated lands from potential impacts associated with the environmental hazard and the operational response. Refer to Appendix [E: Catalog of Designated Lands Resource Protection Measures](#) at the end of this document for examples of designated lands and commonly employed RPMs.

7. Additional Information

7.1 Values at Risk Maps

Values at Risk maps are pre-positioned maps typically derived from the READ Atlas prior to an incident to rapidly inform responders. These products do not contain sensitive data and are intended for immediate, turnkey use on incidents.

Such maps may include:

- Avoidance Area Polygon Maps
 - No Ground Disturbance
 - No Ground Disturbance without READ or ARCH Present
 - Retardant Avoidance Areas
 - Aerial Resource Avoidance Areas
 - No Dip and No Draft Water Sources
 - These water sources may be tiered by “permission” level if necessary
 - Other site-specific resource protection measures
- Special Management Areas (Wilderness, Research Natural Areas, Wild and Scenic Rivers, etc.)

7.2 Suppression Repair Standards

- Identify local suppression repair standards and protocols. Include local unit Suppression Repair Plan Template if available.
 - [NPS PWR Suppression Repair Plan Template](#)
 - [NPS Suppression Repair Plan Library](#)

7.3 Transfer of Information to Burned Area Emergency Response (BAER)

- Identify protocols for the effective transfer of post-fire information from READs to the incident BAER Team.
 - Promote early communication between the incident Lead READ and incoming BAER Team Leader via the Regional BAER Coordinator.
 - Consider the transfer of post-fire impacts information from READs to the BAER Team via a dedicated Field Maps map or otherwise.

7.4 WFDSS Management Requirements for Resource Protection

List current [WFDSS](#) Management requirements which speak to the protection of natural resources, cultural resources and designated lands. Ensure that these MRs are congruent with local management plans/policy and LURG content.

7.5 Links to Local Unit Management Plans, Policy, and Laws

- [NPS Foundation Document Library](#)
- Fire Management Plan
- Resource Stewardship Strategy
- Natural Resource Condition Assessment
- and others as relevant

7.6 Links to Other READ Resources

- Historical Local Unit READ documents
- Examples of [Incident Action Plan \(IAP\) READ Inserts](#)
- NPS FAM READ SharePoint (in development)
- [NPS PWR FAM SharePoint](#)
- [NPS IMR FAM SharePoint](#)
- [NPS FAM BAER SharePoint](#)
- [NWCG READ Subcommittee](#)
- [2017 NWCG READ Guide \(PMS 313\)](#)
- [READ Cohort Drive](#)
- [READ Learning Library \(RELL\)](#)

Appendix A. Catalog of Natural Resource Protection Measures

This appendix is presented as a catalog of potential resource protection measures (RPMs) which units might consider for inclusion in their LURG. **These recommendations are by no means exhaustive in scope.** They are offered as a “tickler list” of examples of commonly used RPMs to prompt units to develop and customize protection measures which are locally relevant and operationally feasible. Units are encouraged to write their own RPMs using clear and specific language which will be understandable to all operational personnel. [Link](#) to Natural Resources section.

Aquatic Wildlife and Critical Habitat

- Special status species and species of concern (RPMs by individual species per local unit requirements)
 - [Example] California red-legged frog
 - Avoid dipping and drafting from waterways known to support red-legged frogs.
 - Avoid saltwater drops in red-legged frog habitat.
 - Avoid off-road driving in red-legged frog habitat.
 - Avoid line construction and soil disturbance in red-legged frog habitat, whenever possible.
 - Seasonality considerations relative to impact
- In-stream modifications
 - [Example] When possible, construct handline, rather than mechanical line, within 100 feet of dry or wet stream crossings.
- Heavy equipment operations and transport
 - [Example] Have dozers lift blades when crossing dry or wet stream beds.
 - [Example] Avoid fording through waterways at sites in which fish are spawning.
 - [Example] Site helispots situated in stream and river channels on durable features outside of the active channel with the goal of not disturbing aquatic wildlife habitat.
- Retardant and fire chemical application (see Retardant and Fire Chemical Application)
- AIS considerations (see Invasive Species/Aquatic Invasive Species)

Aquatic Vegetation (wetlands, riparian vegetation, etc.)

- Operational restrictions and recommendations
 - Line construction through aquatic vegetation
 - [Example] Avoid soil disturbance and the cutting of vegetation within riparian and wetland areas, whenever possible.
 - [Example] Avoid fire suppression operations within wetlands, whenever possible.
 - [Example] Avoid the use of heavy equipment where the compaction of wet soils could occur.
 - [Example] Construct handline, rather than mechanical line, within 100 feet of dry or wet stream crossings, whenever possible.
 - [Example] Have dozers lift blades when crossing dry or wet stream beds.
 - [Example] Consult with READs before conducting fire suppression operations in wetlands and riparian areas.
 - Burnout operations through aquatic vegetation

Aviation

- Water application
 - Dipsites
 - Dipsite selection and approval
 - [Example] Only dip from approved dipsites. Refer to Approved Dipsite Map or confer with READs.
 - [Example] Dip from deep water and away from shorelines to avoid AIS infestations and impacts to sensitive wildlife.
 - Restrictions associated with critical habitat and presence of special status species and species of concern
 - Geographic restrictions to water transfer
 - [Example] Water used for suppression operations may only be delivered within the same watershed that it was sourced.
 - Aquatic Invasive Species (AIS) considerations (*see AIS*)
 - Low volume water sources
 - [Example] Waterways may not be drained to the level in which their outlets cease to flow.
- Restrictions to water application
 - Salt-water

- [Example] Avoid saltwater drops to known critical habitat for special status species and species of concern.
 - In-stream water application
 - [Example] Avoid any direct water application to waterways.
 - Equipment decontamination
 - [Example] As required, disinfect all water conveyance equipment as described in [NWCG PMS 444: Guide to Preventing AIS Transport by Wildland Fire Operations](#).
- Retardant and fire chemical application (see Retardant and Fire Chemical Application)
- Mobile retardant bases
 - [Example] Site mobile retardant bases in locations which will not result in waterway fire-chemical intrusion due to “spatter” following dipping.
- Helicopter route restrictions
 - Critical habitat and species presence restrictions
 - [Example] Avoid staging and operating helicopters within designated wildlife critical habitat and in proximity with known nest sites
- Invasive species management (*see Invasive Species*)
- Helispot/ Helibase
 - Selection and approval
 - [Example] Consult with READs before constructing any new helispot or modifying a pre-existing helispot in a manner resulting in soil disturbance and/or the cutting of vegetation.
 - [Example] Site new helispots on previously disturbed sites or in open areas, whenever possible. Consider the utilization of natural openings and pre-existing helispots before constructing any new helispot.
 - [Example] Site helibases and helispots in weed-free areas to avoid the transport and dispersal of invasive weeds.
 - Construction & Improvement
 - [Example] Retain snags for wildlife benefit unless required for suppression objectives or safety consideration.
 - [Example] Do not cut whitebark pine or limber pine when constructing or modifying helispots.
 - [Example] Site helicopter landing and refueling areas at least 300 feet away from all waterways and wetlands, whenever possible.

- [Example] Site helispots situated in stream and river channels on durable features outside of the active channel.

Botany and Vegetation

- Special status species & species of concern (RPMs by individual species per local unit requirements)
 - Discrete threatened, endangered, sensitive species (TES) or other rare plant populations
 - [Example] Fire operations will avoid rare plant populations to the greatest extent possible during line construction, siting incident infrastructure, etc.
 - [Example] Consult with READs to assist in the avoidance of rare/special status/species of concern plant populations before and during the establishment of all fire management operational sites (e.g., camp location, helibase/ helispot location, fireline construction, etc.).
 - Culturally significant species
 - [Example] Avoid ground disturbance, staging and trampling in areas with known populations of culturally significant plants.
 - [Example] Do not cut culturally modified trees.
 - Large diameter trees
 - [Example] Avoid felling large-diameter trees and snags greater than X in. diameter at breast height unless required for suppression objectives or posing an imminent threat to firefighter safety.
 - [Example] Consult with READs if trees and snags greater than X in. diameter breast height need to be felled.
 - [Example] Avoid constructing fireline immediately adjacent to large diameter trees to minimize damage to root systems, as feasible.
 - Broader-scale species of concern
 - [Example] Whitebark Pine
 - [Example] Do not cut or damage whitebark pine trees or seedlings.
 - [Example] Avoid constructing fireline immediately adjacent to whitebark pine to minimize damage to root systems.
 - [Example] Exclude or promote low intensity fire in whitebark pine populations whenever possible.
 - [Example] Prioritize the protection of whitebark pine with known blister rust immunity.
 - [Example] Giant Sequoia

□ [Giant Sequoia Protection Guidelines](#)

- Meadows
 - [Example] Avoid the construction of firelines through alpine and forested meadows. Site firelines along meadow margins, whenever possible.
 - [Example] All management actions in meadows should be conducted in conjunction with REAFs and ARCHs to avoid damage to sensitive plants/soil and cultural resources.
- Mature/ old growth forests
 - [Example] Avoid cutting large diameter trees and any trees with cavities or nests.
- Alpine vegetation
- Unique botanical areas

Drafting

- Draft site selection and approval
 - [Example] Consult with READs before establishing new drafting sites.
- Critical habitat restrictions
- Aquatic Invasive Species (AIS) considerations (*see Invasives*)
- Geographic restrictions to water transfer
 - [Example] Water used for suppression operations may only be delivered within the same watershed that it was sourced.
- Low volume water sources
 - [Example] Waterways may not be drained to the level in which their outlets cease to flow.
- Fish screen requirements
 - [Example] Utilize approved fish screens on all portable pumps, tenders and engines when drafting and pumping unless determined otherwise by READs.
- In stream modifications (damming)
 - [Example] Consult with READs prior to installing temporary check dams for drafting.
- Impacts to riparian vegetation
- Mobile pumps
 - Selection and improvement of pump sites
 - Fuel containment measures

- [Example] Configure all portable water pump systems (e.g., Mark III) in such a manner that both the pump and fuel cans are situated atop fuel containment reservoirs bearing fuel absorbent pads. At no time should fuel come into contact with any water source. Ensure that fuel containment reservoirs are functionable (prop up inside corners with rocks if needed).
- [Example] All efforts will be taken to avoid fuel contamination into waterways.

Fisheries and Critical Habitat

- Special status species and species of concern (RPMs by individual species)
 - Seasonality considerations
 - [Example] Utilize approved fish screens when drafting from all waterways.
- Retardant and fire chemical application (see Retardant and Fire Chemical Application)
- In-stream modifications
 - Large woody debris
 - Modifications to streambanks and hydrology
- Heavy equipment operations and transport
 - [Example] Limit creek and river crossings to pre-existing travel ways, whenever possible.

Geological Resources

- Sensitive soils
 - [Example] Avoid ground disturbance (line construction, foot traffic, helispots, camps, etc.) in alpine ecosystems, pumice meadows, and areas covered by cryptobiotic (biological soil) crusts, whenever possible.
 - [Example] When fireline or access routes cross sensitive wet habitats (e.g., wet meadows, stream crossings, etc.) consider using temporary bridges (made from onsite downed woody debris) to protect soils and vegetation. Avoid creating muddy travel corridors. Keep routes as narrow as possible.
- Geothermal Resources
 - [Example] Avoid the application of fire retardant chemicals within 300 ft. of known geothermal resources.
- Caves/Karst Systems
 - [Example] Avoid the application of fire retardant chemicals within 300 ft. of known caves and karst systems.
- Permafrost

Infrastructure

- General considerations
 - [Example] Avoid major modifications to roadways, trails, water sources, or clearings except for small scale maintenance to remove obstructions unless authorized by the Park Superintendent.
 - [Example] Video/photograph threatened infrastructure before impact from fire or fire suppression for documentation.
- Utilities
 - Impact avoidance to:
 - Municipal Water Supplies
 - Water intakes, water transference systems, storage facilities
 - Power Plants (hydro-electric sites, substations)
 - Utility Lines
 - Communication Infrastructure
 - Pipelines
 - Structures
 - Roads
 - [Example] Park Superintendent authorization is required in advance of any mechanical improvement of roadbeds as fireline.
 - Bridges
 - Trails
 - [Example] Park Superintendent authorization is required in advance of any mechanical improvement of trails as fireline.
 - Recreation infrastructure
 - Signage
 - Fencing and gates
 - Cadastral markers

Invasive Species

- Biosecurity Measures
- General Considerations
 - [Example] Fire management operations will avoid invasive weed infestations to the greatest extent possible during line construction and the siting of incident infrastructure.

- [Example] Consult with READs regarding current invasive plant locations. As feasible, flag off these sites as avoidance areas.
- [Example] Inspect and disinfect firefighting equipment (e.g., vehicles, heavy equipment, pumps, cargo nets, helicopter buckets, pumps, etc.) and personal line gear (line packs, Nomex clothing, boots, hand tools, tents, etc.) for invasive seed and propagules before re-locating resources to different locations.
- [Example] Establish boot brushing stations so that firefighters may clean gear and boots before accessing fires. Make handheld boot brushes available to firefighters.
- [Example] Consult with READs prior to siting incident infrastructure (e.g., base camps, parking areas, spike camps, staging areas, etc.) to ensure that invasives populations have been identified and mitigated to the greatest extent possible.
- [Example] Order fire hose from the regional cache if the probability exists that local hose may be contaminated with invasive seed or propagules.
- [Terrestrial Invasive Species](#)
 - Disinfection measures
 - Weed wash stations
 - ICP-based weed wash stations
 - ◆ [Example] All vehicles and heavy equipment must be washed at the ICP weed wash station and free of soil, organic debris, plant material, and propagules upon arrival and departure from the incident.
 - ◆ [Example] Vehicles and equipment will be considered disinfected when a visual inspection does not reveal seeds, soil, vegetative matter, and other debris that could harbor invasive propagules.
 - Mobile weed wash stations
 - Transport and disposal of infected materials
 - [Example] Consult with READs before transporting any slash material which may contain invasives or pathogenic organisms.
 - Personnel & firefighting equipment
 - [Example] Vehicles will minimize driving in areas infested with invasive plants, whenever possible.
 - [Example] If firefighters are working in weed-infested areas, establish boot brushing stations and provide garbage bags/receptacles for firefighters to clean gear and dispose of invasive propagules. Do not dump weed seed on the ground.

- [Example] Firefighters will be supplied with boot brushes and invasives identification guides, as necessary.
 - [Example] Fireline personnel will inform READs when they encounter invasive species of concern.
 - Aviation
 - [Example] Build cargo loads on weed-free surfaces or tarps whenever possible.
 - [Example] Conduct visual inspections of helicopter cargo nets and other transported materials for invasive weed seed and propagules before use.
 - [Example] Pre-treat (mowing, mulching, hand removal) frequently utilized helispots and helibases to prevent the transmission of invasives.
 - Land Use Agreements
 - Invasives mitigation requirements
- [Aquatic Invasive Species \(AIS\)](#)
 - General considerations
 - [Example] Do not backflush pumps and charged hoses into surface water. Use check bleeder valves whenever possible.
 - [Example] Direct flow away from water sources when draining pumps or charged hoses.
 - [Example] Dip from deep water, far away from shorelines whenever possible.
 - No dip/no draft sites
 - [Example] Avoid drafting or dipping from any waterway infested with AIS, whenever possible.
 - [Example] Only dip from approved dipsites. Refer to Approved Dipsite Map or confer with READs.
 - Disinfection measures
 - [Example] Implement water transport disinfection measures as identified in NWCG PMS 444: Guide to Preventing AIS Transport by Wildland Fire Operations.
 - [Example] Clean and sanitize fire management equipment (helicopter buckets, tanks, pumps, etc.) upon arrival to and departure from an incident.

- [Example] Helicopter buckets will be inspected for the presence of AIS (plant material and dirt) in advance of dipping operations.
- [Example] Helicopter buckets should be inspected and disinfected for AIS between dipsites whenever possible.
- [Example] At a minimum, dry all water delivery equipment completely in the sun following an incident or before transitioning equipment between watersheds.

Investments and Economic Values

- Considerations (e.g., fire exclusion) for:
 - Special Use Permit/Leased Areas
 - Grazing Allotments
 - Infrastructure
 - ◆ Fences, Gates, Guzzlers
 - Agriculture (orchards, crop fields)
 - Restoration/ Reforestation Projects
 - Invasives Treatments
 - BAER/BAR Treatments

Paleontological Resources

- [Example] Avoid ground disturbance in areas of know paleontological resources without a READ present.

Pathogens (e.g., Sudden Oak Death, Port Orford Cedar Root Disease, Chytrid, etc.)

- Disinfection measures
 - [Example] Prior to engaging on the incident, all vehicles are required to be cleaned at the ICP weed wash station.
 - [Example] Prior to demobing from the incident, all fire personnel must disinfect saws, hand tools, and fire boots with a 70% isopropyl alcohol solution and all vehicles and heavy equipment must be cleaned at the ICP weed wash station.
 - [Example] All water sources (porta tanks/pumpkins) situated in watersheds with Port Orford Cedar Root Disease must be disinfected per incident standards before water is delivered on the incident.
- Operational restrictions
 - Avoidance areas
 - [Example] Avoid the cutting of vegetation and ground disturbance in areas of know pathogens.

- [Example] Avoid the transmission of pathogens into caves.
- Transport and disposal of infected materials
 - [Example] Consult with READs before transporting any slash material which may contain pathogenic organisms.

Retardant and Fire Chemical Application

- Required approvals
 - [Example] Application of fire retardant chemicals requires pre-authorization from the Park Superintendent.
 - [Example] Retardant use is limited to instances when the risk to life or property is greater than potential resource damage from the retardant.
 - [Example] Consult with Resource Advisors before the application of fire chemicals.
- General Measures
 - [Example] Avoid the application of retardant and other fire chemicals in locations identified as retardant avoidance areas. Refer to the incident Retardant Avoidance Area Map.
 - [Example] Utilize fugitive forms of retardant to the greatest degree possible.
 - [Example] Avoid retardant application to rock features to minimize visual impacts.
 - [Example] Avoid the application of fire retardant chemicals within X ft. of designated aquatic critical habitat.
 - [Example] Avoid the application of fire retardant chemicals within X ft of glaciers and snowfields.
- Aerial delivery
 - Avoidance Buffer zones
 - Waterways
 - [Example] Fire retardant chemicals will not be applied within 300 feet of waterways, whenever possible.
 - [Example] Fire retardant use is prohibited in and adjacent to geothermal areas.
 - Critical habitat
 - [Example] Avoid the application of fire retardant chemicals within X ft. of designated aquatic critical habitat.
 - Cultural resources
 - [Example] Avoid the application of fire retardant on historic structures and features, unless imminently threatened by wildfire.

- Terrestrial Delivery
 - Avoidance Buffer zones
 - Waterways
 - ◆ [Example] Fire retardant chemicals will not be applied within 300 feet of waterways or in a manner in which they would reach waterways, whenever possible.
 - ◆ [Example] Fire retardant use is prohibited in and adjacent to geothermal areas.
 - ◆ [Example] Avoid the application of all fire chemicals within 300 ft. of known caves and karst systems.
 - Critical habitat
 - ◆ [Example] Use of fire retardant is not advised within designated critical habitat unless imminently threatened by wildfire.
 - Cultural resources
 - ◆ [Example] Avoid the application of fire retardant on historic structures and features, unless imminently threatened by wildfire.
 - Reporting retardant application
 - [Example] The Air Operations Branch Director will report the location of retardant application, type of retardant used, gallons applied, and date of application to the Lead READ within one day of application.
 - Misapplication reporting
 - [Example] Report any known occurrences of fire chemical misapplication to the Lead READ immediately.
 - Disinfection requirements
 - [Example] Ensure that all chemical delivery systems have been completely cleaned before resuming dipping in natural water bodies.

Spill Prevention and Containment Measures

- [Example] In the event of a hazardous fuel or chemical spill, inform a READ and follow protocols outlined in the incident Hazmat Plan.

Spike Camps

- Selection and approval

- [Example] Utilize pre-existing campgrounds, previously disturbed areas, or areas with durable vegetation and surfaces whenever possible.
- [Example] Avoid areas in which invasives species are present.
- [Example] Site new campsites in locations which are unlikely to be encountered by wilderness visitors in the future.
- [Example] Avoid siting camps in wet meadows, fragile subalpine/alpine vegetation, on biological soil crusts, along riparian areas, or on lake shores.
- [Example] Locate equipment staging areas and camps (unless pre-existing) greater than 300 feet from any waterway and wetlands.
- [Example] Avoid establishing spike camps in the vicinity of designated wildlife Critical Habitat and known cultural resource sites.
- [Example] Locate spike camps outside of Wilderness whenever possible.
- [Example] Consult with READS before selection of spike camp locations.
- General considerations
 - [Example] Do not clear vegetation, trench, or excavate soil to create campsites. Minimize disturbance to vegetation and soil when establishing crew sleeping areas.
 - [Example] READs will advise camp managers on minimum impact camping practices (e.g., food storage, human waste management, camping and campfire locations, access, etc.) for both front country and backcountry camps.
 - [Example] Avoid the development of social trails within spike camps. Clearly identify travel routes to avoid creating unnecessary social trails
- Food and garbage storage
 - [Example] Ensure that all food and garbage is securely stored to prevent access to wildlife. Storage of food in vehicles may not be sufficient.
 - [Example] Keep all food wastes out of waterbodies.
 - [Example] All garbage, including micro-trash, flagging and food wastes, will be removed from the site following use.
- Sanitation
 - [Example] Establish latrines greater than 300 feet way from waterways.
 - [Example] Catholes should be dug to a depth of 6 inches and all communal latrines to a depth of 12 inches or greater. Pack out all toilet paper/body wipes/feminine hygiene products (do not bury).
 - [Example] Prioritize the use of backcountry toilet systems over establishment of latrines.

- [Example] If existing latrines are not available, a READ will assist crew in identifying solutions for human waste management.
- [Example] Utilize biodegradable soap for washing. Keep soap out of all waterways.

Wilderness (see Appendix E)

- [Example] All fire management activities conducted in Wilderness will employ Minimal Impact Strategies and Tactics (MIST).
- [Example] Incident personnel will follow Leave No Trace (LNT) practices, to the greatest degree possible.
- [Example] Embed a READ with any large crews working or camping in designated wilderness.
- [Example] The use of any mechanized equipment in Wilderness requires prior authorization by the Park Superintendent.

Wildland Fire Operations

- Construction of firelines and other features
 - General line construction
 - [Example] Consult with READs before conducting operations in any area delineated with READ avoidance area flagging.
 - [Example] Locate firelines outside of highly erosive areas, steep slopes, and other sensitive areas, whenever possible.
 - [Example] Establish containment lines on previously disturbed areas (roads, trails, recent firelines, etc.) and/or along natural features (scree slopes, creeks, ridgelines, wet meadows, etc.) which would limit fire spread, whenever possible.
 - [Example] Construct firelines outside of areas with large trees and/or abundant snags, whenever possible.
 - [Example] Consider holding the fire's perimeter with a wetline or scratchline, whenever feasible.
 - [Example] Construct fireline as appropriate to anticipated fire progression and intensity. Match width and depth of fireline to those conditions necessary for stopping fire spread.
 - [Example] Avoid constructing fireline immediately adjacent to large diameter trees and whitebark pine to minimize damage to root systems, as feasible.
 - [Example] Avoid fording through waterways at sites in which fish are spawning. If crews must cross through these areas, avoid locations with

mounded gravels and where the gravel is "brighter" (lighter colored) than the surrounding substrate.

- [Example] Remove flagging and signage when no longer needed.
- Manual line construction
- Mechanical line construction
 - Required approvals
 - [Example] Use of mechanized equipment including dozers, road graders, excavators and other types of ground disturbing heavy equipment must be approved by the Park Superintendent.
 - Line construction through riparian areas
 - [Example] When possible, construct handline, rather than mechanical line, within 100 feet of dry or wet stream crossings.
 - [Example] Bulldozers will lift blades when crossing dry or wet stream beds.
 - [Example] Avoid mechanical line construction within 100 feet of active streams
 - Line prep
 - [Example] Limb only those fuels adjacent to the fireline with the potential to spread outside the line or produce spotting issues.
 - [Example] Minimize the bucking of downed logs.
 - [Example] Scrape around tree bases (living & dead) likely to cause fire spread or act as ladder fuels in lieu of felling.
 - [Example] Align saw cuts away from trails and visible areas, whenever possible
 - Mastication operations
 - [Example] Avoid damage to large trees whenever possible.
 - [Example] Avoid impacts to sensitive tree species such as whitebark pine, limber pine, aspen, etc.
 - [Example] Heavy equipment must stay within the road or trail prism unless approved by READs.
 - [Example] Avoid gouging paved road with tracked equipment, whenever possible.

- ◆ [Example] When working on asphalt surfaces, utilize wheeled equipment or machinery equipped with rubber tracks, whenever possible.
 - [Example] Avoid impacts to road infrastructure such as culverts, retaining walls, signs, cattle guards, fences, etc.
- Chipping operations
 - [Example] Whenever possible, chip brush into trucks for removal. Consult with READs as to location to deposit chips.
 - [Example] When chipped materials are deposited to the ground, fan out the distribution of chips to avoid the deposition of chips any deeper than 3 inches.
 - [Example] Rake out chip piles so that they resemble the surrounding topography.
 - [Example] Avoid chipping materials onto sensitive cultural or natural resources. Consult with READs regarding the location of sensitive sites.
 - [Example] Avoid chipping materials into active and dry waterways.
- Feller buncher and processor operations
- Fireline explosives
- Firebreaks
- Burnout operations
 - [Example] Conduct burnout operations in a manner and under conditions which promote low/moderate burn severity, as feasible.
- Water application
 - Restrictions to in-stream water application
 - [Example] Direct flow away from water sources when draining pumps or charged hoses.
 - [Example] Do not backflush pumps and charged hoses into surface water. Use check bleeder valves whenever possible.
 - [Example] Avoid any direct water application into waterways.
- Mop-Up
 - [Example] In areas with low spotting potential, allow large-diameter logs (and snags) to burn out naturally.
 - [Example] Flush cut stumps and staubs.

- [Example] Scatter unburned fuel rather than piling, as feasible.
- Temporary incident infrastructure
 - Selection and approval
 - [Example] Site helispots, staging areas, spike camps, and other constructed locations at least 300 feet away from streams, creeks, and other water sources.
 - [Example] Minimize soil and vegetation disturbance associated with camps, staging areas, helispots, lookout locations, etc.
 - [Example] Confer with READs in advance of siting incident infrastructure.
- Off-Road Vehicle Use
 - Heavy equipment
 - [Example] Use of mechanized equipment including dozers, road graders, excavators and other types of ground disturbing equipment must be approved by the Park Superintendent.
 - Vehicles & UTVs
 - [Example] Motor vehicle use is limited to maintained park roads. Use of all motorized vehicles off of maintained roads must be approved by the Park Superintendent.
 - [Example] Utility Task Vehicles (UTVs) are not permitted off-road except in life-threatening situations. The use of UTVs should only be considered when no other options are available.

Wildlife and Critical Habitat

- Special status species and species of concern (RPMs by individual species per local unit requirements)
 - [Example] Northern Spotted Owls
 - [Example] Protect occupied and previously occupied northern spotted owl PAC sites
 - [Example] Avoid the cutting any trees greater than 18 inches diameter at breast height or trees with large cavities or deformities that would enhance nesting substrate.
 - [Example] Protect secondary canopy of oak and bay trees.
 - [Example] Avoid creating large light gaps in the forest canopy
 - ◆ [Example] Minimize burn intensity/severity within ¼ mile of known PAC sites.

- Seasonality considerations relative to impact
- Food and garbage storage
 - [Example] Ensure that all food and garbage is securely stored. Store food and other scented items in:
 - [Example] Bear-proof food lockers or canisters
 - [Example] Locked and secure buildings
 - [Example] Locked and secured vehicles (least suitable option).
 - [Example] Lock vehicle doors and roll up windows when not in use.
 - [Example] Remove food, garbage, and scented items from vehicles at night.
 - [Example] Report any adverse wildlife encounters (including obtaining food) to READs.
- Snags
 - [Example] Retain snags for wildlife benefit unless required for suppression objectives or safety consideration, whenever possible.
 - [Example] In areas with low spotting potential, allow large-diameter logs (and snags, when safety allows) to consume naturally.

Appendix B. Additional References for Cultural Resources

The following appendix presents general steps to foster effective protection of cultural resources during a wildland fire or other hazard incident. The recommendations and procedures outlined below are by no means exhaustive in scope. They are intended as a baseline for establishing protection and avoidance measures with the goal of avoiding damage or loss of cultural resources. The information presented in this section should not be viewed as a stand-alone portion of the LURG that is addressed after the LURG is completed. Rather, these protection and avoidance measures should be integrated with the natural resource protection measures since many cultural resources include a natural resource component. Effective protection and avoidance rely on annual preparedness tasks that are outlined in this section to identify cultural resources, prioritize sensitive resources, develop effective resource protection measures, and apply appropriate post-incident response where applicable. [Link](#) to Cultural Resources Section.

Resource Protection Measures for Cultural Resources

Site Protection Considerations

If fire can/will destroy a cultural resource, err on the side of over-protection and over-recording through the following measures:

- describe it in notes
- photograph it
- map it on site map
- determine protective measures that will have minimal impacts on cultural resources,
- implement resource protection measures

Triaging

- 36 CFR Part 800-Protection of Historic Properties does apply to all hazard and wildland fire activities. Section 12 of Part 800 and section VII National PA applies specifically to emergency situations. In practice it is a condensed process of notification rather than consultation, requesting concurrence
- Do not evaluate cultural resources for National Register of Historic Places (NRHP) eligibility during the environmental hazard. There is generally not enough time or info to determine eligibility and there are usually more resources at risk than there are resources to evaluate them.
- Do determine a prioritization on which resources are to be protected first. Determine significance through what you do know at that time without more information.
- Use a triage system, because there are more resources than people to protect them, so you need to triage without the ability to evaluate.
 - Ability to protect the resource, and
 - Time until resource will be impacted.
- Notes on Triageing:

- It will be different for every unit based on their resources, and
- It may be different on every incident because of the size of the incident and how it overlaps with the resources in unit.
- It needs to be flexible enough for changing conditions. Recognize that cultural resources may seem safe when you are there, but conditions may change, and they may be affected by an environmental hazard.

In addition to the avoidance, mitigation, and minimization measures listed below, also review the Resource Protection Measures for Natural Resources to ensure ethnographic resources and cultural landscapes are adequately protected. There may be several protection measures in the National Resources Protection Measures section that apply to protecting cultural resources depending on the type of incident and type of cultural resources.

Human Remains or NAGPRA Cultural Items

Inadvertent Discovery of Human Remains or Cultural Items (as defined in 43 CFR 10.2)

- Comply with 43 CFR Part 10 Subpart B – Protection of Human Remains or Cultural Items on Federal or Tribal Lands
 - Ensure all parties understand their responsibilities and requirements for notification under 43 CFR 10.5 Discovery
 - Report any discovery – 43 CFR 10.5(a)
 - Cease any nearby activity – 43 CFR 10.5(b)
 - Respond to a discovery – 43 CFR 10.5(c)
 - Approve and sign a plan of action – 43 CFR 10.5(d)

In the event that Native American human remains and/or associated funerary objects are discovered, ARCHs will notify Law Enforcement, the Lead Archaeologist, the unit Superintendent (or their designee) and culturally affiliated Tribes as soon as possible (43 CFR 10.5(a)). The ARCH will immediately take all measures practical and necessary to minimize impacts to the area. In consultation with culturally affiliated Tribes, such measures will include marking the area for avoidance from ground disturbing activities with flagging and informing the Dozer Boss and/or Division Supervisor (in person rather than on the radio) that there is a highly sensitive heritage resource that is marked and needs to be avoided. Any activity within the site boundary will be avoided if possible, and no prehistoric human remains and/or NAGPRA cultural items shall be collected or removed from their immediate vicinity. Any necessary operations conducted within the site boundary should be conducted using minimum impact strategies and tactics. ARCHs will coordinate the implementation of site protection measures, such as blacklining, wet-lining, foam lining, or construction of handline with the dozer boss and/or Division Supervisor, if needed, and archaeologists should work with the fire staff to move the AMR activities away from the area. Firefighters should avoid directly applying fire retardant or foam to human remain and NAGPRA cultural items.

At the end of each shift (but no later than 24 hours after the discovery) the Lead Archaeologist must send written documentation of the discovery to the unit superintendent (or their designee) and culturally affiliated Tribes stating the geographic location, contents of discovery, and temporary measures taken to secure and protect the human remains and/or NAGPRA cultural items; 43 CFR 10.5(a)(3). Within three days of receiving written documentation of a discovery, the unit superintendent (or their designee) must respond to the discovery as per 43 CFR 10.5(c) and begin development of a plan of action (if no plan of action is currently in place) in accordance with 43 CFR 10.5(d). All human remains will be treated with appropriate respect. Disrespectful or inappropriate treatment of human remains will not be tolerated and is cause for dismissal from the incident.

Avoidance

- **Pre-identified Avoidance Areas** are larger areas pre-identified on maps.
 - Identify sensitive cultural areas utilizing information from the [CRIS](#) database, park-unit or regional CR GIS database(s), and Tribal information. Understand accuracy of data to inform incident response.
 - Identify activities to avoid by cultural resources type including retardant or foam application, dips, soil disturbance; spike camps, helispots, water tanks, repeaters, dozer/fireline, etc.
- **Identified Avoidance Areas** are smaller areas identified by field work during the incident.
 - An ARCH, coordinating with appropriate qualified cultural resources personnel, should be on site to guide work near these areas.
 - Identify and flag for avoidance vulnerable cultural resources during actions such as dozerline construction.
 - Exclusion of fire or flood through line or dike construction.
 - Create fire breaks near/around cultural resources.
 - Exclusion of fire through the application of water, foam, or fire shelter material to protect structures when necessary.
 - NEVER use retardant or foam on rock art.
- **Artifact removal:** Consider the temporary removal of important and portable artifacts, as required if impacts cannot be avoided.
- Avoid direct application of all use of retardants, foams, and wetting agents on rock art sites and historic buildings. However, use of retardants, foams, and wetting agents in establishing wet line around such cultural resources is a viable tactic, where practical to do so.
- Avoid dropping any trees on cultural resource sites.
- Avoid bucket drops in the immediate vicinity of structures and sites, which may result in inadvertently dropped trees.

General Mitigations

- **Mark Boundaries:** During project prep, ignition, and mop-up activities, no dragging, piling, or burning of fuel may occur within any archeological site boundaries, ethnographic resource boundaries, and cultural landscape boundaries. ARCHs will mark site boundaries to avoid impacts to sites from such activities.
- **No Staging:** Staging vehicles or equipment on sensitive cultural resource sites or in culturally sensitive plant communities or soils.
- **Monitoring work in or near sites:** No ground disturbing activity may occur on a cultural resource site without an ARCH present to ensure that effects are minimized. Ensure that professional qualifications, experience and access to the appropriate cultural resource specialists have been considered in selecting ARCHs to monitor cultural resource sites.
- **New Sites:** If previously unidentified or concealed cultural resources are encountered during project activities, all necessary steps will be taken to protect them and to notify an ARCH or READ at the soonest available opportunity following discovery if one is not present during the operational response.
- **Maps provided to incident personnel:** A simplified map identifying the general location and protection prioritization of cultural resources and associated hazards (i.e. mine openings, hazardous mill tailings) can be provided to incident personnel. The map must be at a scale that makes land navigation possible. Maps greatly simplify communications and promote the safety of incident personnel.
- **Patrolling sites:** Patrols to monitor cultural resource locations/sites should continue as long as a threat to those resources remains including after the cessation of the initial environmental hazard when incident operations are still being conducted in their vicinity.

Fire Mitigations

- **Fuels Saturation:** Saturate ground/grass adjacent to vulnerable structures with water, foam, or gel before burning.
- **Fuels Mitigation:** Minimize fuels and smoke near rock art and historic buildings. Conduct fuel reduction around structures, sites, or features. Manually reduce fuels on and/or around vulnerable sites and pile debris offsite. Remove logs/heavy fuels from vulnerable sites/features (e.g., clear snags off bedrock mortars), or cover with foam or retardant prior to burn. Flush cut and cover stumps with dirt, foam, or retardant, where burnout could affect subsurface cultural resources. Identify and reduce hazard trees next to historic structures. Limb culturally significant trees next to historic structures when possible, rather than removal.
- **Rock Art:** Assess and determine the appropriate protection measures.
- **Dendroglyphs:** Wrap carved trees, dendroglyphs, and other such features in fire retardant fabric. Limb carved trees to reduce ladder fuels.

- **Post Fire Assessments:** All fire-sensitive sites shall be evaluated post-fire and any effects from fire will be documented.
- **Mitigating snags near cultural resource sites:** Because dead snags are so susceptible to fire, pay close attention to their location on or in close proximity to cultural resources. Mitigation measures to lessen their threat can include excavating containment line around snags to prevent fire from creeping into their base, pre-treat snags with water or foam to lessen the likelihood they will burn, or remove them entirely from the cultural resource site when possible.
- **Pile burning and jackpot fuels:** Fuel reduction piles and “Jackpots” of large diameter down woody debris located near containment lines should either be scattered away from the line or piled outside site boundaries prior to burning.
- **Burnout:** Burnout around vulnerable sites.
- **Aerial ignitions:** As much as possible, the perimeters of the fire-sensitive sites or FEATURES must be marked so that they can be seen from the air, using photo target fabric or GPS coordinates. Orange-colored, plastic flagging has been found to be effective. Markings consist of crosses that have arms that are at least four feet long, and are placed in an open area, easily viewed from a helicopter. If an entire site area is fire-sensitive, then the markings should be around the boundary of the site. If only particular features are fire-sensitive, then the markers can be placed around the perimeter of the fire-sensitive features. An ARCH familiar with the sites and the method used to mark them will fly a reconnaissance flight with fire personnel to make certain that the locations of these sites are known and that the sites, or areas, can be avoided during aerial ignition activities.
- Water, retardant, foam, and fuel reduction not resulting in ground disturbance may be employed as alternative treatments on archeological resources, see section below on wildland fire chemicals.
- **Historic structure mitigation:** For standing architecture or other historic structures, where structural stabilization needs to be accounted for in these mitigations, the appropriate SME(s) should be consulted. Defending historic buildings requires identifying appropriate mitigation measures in coordination with structural fire personnel to implement appropriate type of structural fire protection or non-structural protection, including thinning, handlines, and/or installation of temporary sprinkler systems. Remove or minimize flammable materials from the area immediately adjacent to the structures, such as furniture, wood piles, and construction materials. Shelter fabrics and water application may be employed as alternative treatments on historic buildings. Care should be taken to follow manufacturer’s recommendations on shelter wrap application. Incorrect application of shelter wrap can be ineffective in preventing radiant heat damage and/or damage from short periods of direct fire impingement.

Fire Minimization

- When possible, assign an ARCH to operational personnel conducting incident operations, including fire suppression or suppression repair in the vicinity of known cultural resource sites.
- When possible, survey proposed disturbance areas before operations are conducted.
 - e.g., firelines, helispots, and spike camps.
- Site camps, staging areas, helispots, spike camps, etc. at least 200 feet from known cultural resource sites.
 - Consult with READs on proposed locations of camps, staging areas, safety zones, helispots, or other operational actions which may disturb cultural resources.
 - Educate crews about reporting procedures and the need to protect cultural resources
- Anticipate that mop-up activities can be more damaging than other forms of incident management, e.g., fire lines, so keeping indirect actions such as control lines and the fire outside of sites is a priority. Advocate for the use of Minimum Impact Strategies and Tactics
- Utilize burnout operations where needed.

Wildland Fire Chemicals

Application of fire retardant and other fire chemical products have the potential to affect cultural resources, although use of fire retardants on cultural resources may protect them from destruction during a fire. Heritage resource specialists may need to consider fire effects versus the effects of retardant use or the possibility of other protection options during a fire.

If retardant is applied to historic buildings or rock art, retardant should be washed off as soon as possible. For buildings, pre-soaking, then hand-brushing with water and a mild detergent may work for sandstone or painted wood. Metals and glass may be wiped with water and a mild detergent. Power washing, sandblasting, and acid based washes must be avoided because these actions can cause further damage.

Online resources:

- [*Wildland Fire Chemicals and Aerial Delivery Systems*](#)
- [*Interagency Wildland Fire Chemicals Policy and Guidance*](#)

There are various potential effects from use of retardants, foams, and water:

- Rapid cooling: dumps of any of these materials on hot surfaces may cause effects to archaeological materials (e.g., artifact fracture) from rapid temperature change
- Materials dumped onto fragile cultural resource features may break/ displace them
- Long-term retardants contain salts which can be desiccants, which damage old, fragile wood and may cause spalling in stone
- Chemicals may cause corrosion in metals
- Iron oxide additives may leave a permanent red stain and corrosion inhibitors in the retardant may turn surfaces, especially metals, blue or black
- Foams may hasten rusting on metal surfaces by removing protective coatings and may cause wood to flake due to swelling and contracting
- Water enhancers are desiccants and may damage wood surfaces, strip surfaces of finishes, and damage sandstone; they are also difficult to remove from wood surfaces, especially for old or fragile wood

Post-Incident Stabilization or Recovery Mitigation

- Document (via photograph and written description) direct and operational impacts to cultural resources as well as (prior to and following) mitigation activities and suppression repair treatments. Identify future needs.
- Pick up and remove all flagging, garbage, litter, and equipment. Dispose of trash appropriately.
- Clean fire pit of unburned materials and fill back in.
- Discourage use of newly established trails created during the incident by covering with brush, limbs, small diameter poles, and rotten logs in a naturally appearing arrangement.
- If impacted trails have developed on slopes greater than six percent, construct waterbars as directed by the incident Suppression Repair Plan. Ensure that the placement of any water diversion measures do not create additional risks to resources downslope.
- Replace dug-out soil and/or duff and obliterate any berms created during the incident.

Annual Preparedness Tasks for the Protection of Cultural Resources

Annual preparedness tasks include identifying the accuracy of data such as ensuring the accuracy of resource locations, prioritization of protection for resources, and updating emergency contacts. Parallel to these annual preparedness tasks are long-term planning tasks such as staff training, developing specific plans based on type of incident response, cyclic maintenance and rehabilitation planning to reduce threats to cultural resources, and filling in data gaps for more efficient/ effective cultural resources incident response.

- Identify the location and accuracy of essential data and supplies needed to support event response and recovery functions. Update the accuracy of cultural resources locations and types.
 - [Cultural Resources Inventory System \(CRIS\) database](#)
 - Cultural Resources GIS databases
 - Local park-unit authoritative geodatabase
 - Regionally published geodatabase
 - [Pacific West Regional Office](#) (PWRO) Enterprise Geodatabase
 - Park Cultural Resources files
 - Historic structures protection supplies
 - Museum collections supplies - shelter-in-place, response, recovery
- Update Cultural Resource Data to Inform CR Component of READ Atlas
 - Include general characterization of resource types
 - Include recorded sites
 - Include survey areas with reliability assessment
 - Include known hazards (blasting caps for mines, unexploded ordinances (UXO) for past military uses)
 - Include CRIS database
 - Include CR GIS database
 - Consult with Tribal partners to identify sacred sites, if not documented in the CRIS database.
 - Identify location of ethnographic resources and sacred sites through either CRIS or consultation with traditionally associated group.
 - Include prioritization for protection.
- Update Cultural Resources Contact Information
 - Park contacts
 - Regional office contacts
 - Tribal, Traditionally Associated Communities, Native Hawaiian, or Alaska Native contacts
 - Sensitive information contact
- Reevaluate Resource Protection Measures and Priorities
 - Verify protection strategies associated with:

- Fire sensitive sites
- Priority categories and site prioritization
- LURG CR content
- Avoidance, mitigation, and minimization strategies, including those contained in treatment documents
- Fire retardant/chemical products
- Fuel treatment prior to fire season
- Verify Sensitive Data Criteria and Protection Measures
 - What resources are sensitive?
 - Identify how sensitive information is distributed.
 - What can be mapped?
 - Determine acceptable treatments in sensitive areas.
- Prioritize Cultural Resources

Cultural resources should be prioritized by an interdisciplinary team led by cultural resources staff and ARCHs so that crews can most effectively direct operations to protect, minimize, or avoid sites that could be adversely affected by incident operations. Cultural resource priorities are determined before an incident by examining cultural resource types, their significance, and their sensitivity. Protection prioritization assists incident management teams, managers, cultural staff, and ARCHs in focusing treatment efforts and increasing work efficiencies.

- Prioritization of cultural resources, including archeological sites, ethnographic resources, cultural landscapes, museum collections, and historic structures, for protection during an incident is an interdisciplinary effort that must occur prior to an incident.
- Prioritization factors in data that is assessed prior to an incident. Considerations for prioritization of cultural resources may include data on the site's level of data potential, the cultural resources sensitivity to the environmental hazard, actions that can be taken to limit damage during an environmental hazard, rare cultural resource types, special status, i.e., National Historic Landmarks, or features, or buildings that house museum collections (see **Appendix C: Additional References for Museum Collections**).
- Consider creating a comprehensive “top ten” list of priorities regardless of type of cultural resource. Develop a priority list by incident type, as there may be differences in sensitivity of resources to different types of environmental hazards that may change top protection priorities.
- **Ethnographic Resources Prioritization:** Prioritization of ethnographic resources and sacred sites should be performed through consultation with the traditionally associated group(s) who value the resource. (see Section 5.0 Tribal Interests Appendix D). In all cases, consideration

must be given to Tribal values and indigenous knowledge regarding the key elements and attributes of each site or resource and these should be incorporated in all protection strategies.

- For ethnographic resources such as culturally sensitive plant populations or other kinds of natural resources which exhibit cultural value, protection measures identified in Appendix A for that resource type can be used as a starting point for consultation with the Tribe(s). Efforts should be made to accommodate Tribal perspectives and indigenous knowledge into the development of prioritization and protection measures for each resource.
- Ethnographic resources that are also archeological sites or historic structures should be considered priority 1 sites and utilize protection measures best suited to the preservation and protection of that resources type as identified through consultation.
- Sacred sites should be considered priority 1 sites and utilize protection measures best suited to protection and preservation of the elements of the sacred site most susceptible to impacts from the wildfire or hazard as identified through consultation.
- **Prioritization of sensitive cultural resources:** Sensitive cultural resources contain features that will be adversely affected by an environmental hazard. Adverse effects are those that would destroy or significantly diminish the National Register integrity of a cultural resource. Adverse effects could result from spalling of rock containing inscriptions, petroglyphs, or pictographs, combustion of wooden structures, buildings, vegetation, and objects, melting, bursting, or severe fracture of bottles and other glass objects, combustion of other site materials made of organic materials such as leather, yucca fibers and the like, or disturbance to burials. Additional adverse effect could result from flooding, debris flows, erosion, high winds, and driving rain which could display or destroy cultural resources.
- Considerations for determining the sensitivity of cultural resources to environmental hazards include:
 - Would environmental hazard effects diminish cultural resources integrity by destroying character defining features and elements?
 - Would environmental hazard effects destroy our ability to assess cultural resources' cultural affiliation?
 - Would environmental hazard effects destroy our ability to assign cultural resource chronology?
 - Would environmental hazard destroy features, artifacts, or structural elements?

Appendix C. Additional References for Museum Collections

The following content provides a template for the organization of the Museum Collections section of the LURG. This section may be tiered off to an existing Museum Collection Emergency Operation or Response Plan. [Link](#) to Museum Collection section.

Introduction

Provide the following museum collection information:

- Brief collection overview – collection quantity, locations/facilities
- Brief overview of potential risks to museum collections
- Summary of Museum Collection Priority Designations (see Section 6)
- List of Collection Locations/Facilities - tie to “Buildings” section of LURG
- General map of collection location(s)/facility(ies) - tie to READ Atlas

Section 1 - Museum Emergency Call List

- Verify all emergency numbers at least annually.
- Continue working to develop a network of local museums, government agencies, and businesses for mutual support. For example, this is critical for wet collections or archives that may need to be quickly frozen.
- Park Personnel
 - Superintendent
 - Curator, Curator of Record
 - Chief, Maintenance
 - Chief, LE Ranger
 - Chief/Supervisor, Resources Management
- Fire/Intrusion Alarm System Company or Park Personnel
- Potential NNP Support Telephone Numbers
 - Regional Office
 - Other, Nearby Parks
 - Harper Ferry Center (HFC) Museum Conservation and Collections Staff
- Local Emergency Aid, Power, Utility, Telecommunication Contacts
- Culturally Affiliated Tribe(s), Park Partners
- Other Federal Agencies
 - Federal Bureau of Investigation (FBI)

- Bureau of Alcohol, Tobacco, and Firearms (ATF)
- Federal Emergency Management Agency (FEMA)
- Environmental Protection Agency (EPA)
- Other Jurisdictions (State, County, City)
 - Fire Department
 - Emergency Communication Center
 - Police Department
 - State Historic Preservation Officer (SHPO)
 - Department of Transportation

Section 2 - Maps and Plans

- Update floor plans whenever the situation changes.
- Update Utility Shut-off locations whenever the situation changes (e.g., installing new equipment).
- General Map of Collection Locations and Facilities
- For each Collection Facility - tie to “Buildings” section of LURG and READ Atlas
 - Brief Overview of collections
 - Facility Floor or Site Plan(s) showing
 - Primary Fire/Electrical/Security/Water Devices
 - Doors, Windows
 - Images for illustration, clarity

Section 3 - Museum Emergency Response Team

- Add specific responsibilities to lists if necessary.
- Continue to update the response team annually based on changes in staff/duties.
- Museum Emergency Plan Coordinator
 - Name, Title, Contact Info
 - Name, Title, Contact Info of Alternate Museum Emergency Plan Coordinator(s)
 - Reports to Park-wide Emergency Plan Coordinator
 - Informs Superintendent of progress throughout response and recovery efforts
 - Assesses need for emergency procedures and salvage
 - Assembles Collections Emergency Team
 - Name, Title, Contact Info for each Team member

- Implements emergency plan as directed
 - Moves objects, conducts documentation, salvages as directed
- Establishes central meeting or control area with Incident Command (or equivalent)
- Initiates emergency preparedness
 - depending upon the threats/risks and as needed
 - determines if collections remain in place or are evacuated, examples:
 - archives are properly draped with plastic
 - priority objects are carefully removed from exhibits & properly boxed/stored
 - ensures window and doors are secured for spaces holding museum objects
 - oversees emergency efforts including documentation, salvage, and security
- Coordinates emergency efforts with other park staff and involves them when necessary
- Works with Facilities Manager to control building environment when possible
- Communicates with responders of location and extent of known museum hazards
 - Nitrate film
 - Alcohol specimens
 - Ammunition and unexplode ordinances (UXO)
 - Cleaning and conservation supplies
- Conducts follow-up activities, including clean-up, museum collection incident report, post-emergency critique, and written acknowledgement of assistance received during the incident
- Emergency Museum Registrar
 - Name, Title, Contact Info
 - Name, Title, Contact Info of Alternate Emergency Museum Registrar(s)
 - Reports to Museum Emergency Plan Coordinator
 - Keeps emergency log and oversees documentation of disaster and emergency procedures
 - Documents movement and treatment of all objects
 - Labels all boxes/items moved – label by priority if designated

- Contacts local suppliers and services
- Under supervision of Emergency Plan Coordinator and in conjunction with Incident Command Administration, proceeds with established Emergency Purchasing measures
- Museum Salvage Coordinator
 - Name, Title, Contact Info
 - Name, Title, Contact Info of Alternate Museum Salvage Coordinator(s)
 - Reports to Museum Emergency Plan Coordinator
 - With Museum Emergency Plan Coordinator establishes immediate priorities for protection and salvage
 - Oversees immediate protection of museum objects in danger
 - Oversees packing and relocation of museum objects
 - Oversees implementation of appropriate collections salvage procedures
 - Contacts local conservators, HFC staff, as available

Section 4 – General Museum Emergency Response and Salvage Procedures

- Establish and review trigger points in the form of operational and/or environmental limits ahead of emergency response. Trigger points are not decision-makers but serve as predetermined cues to help parks determine and implement the proper course of action.
- Review emergency procedures after all emergencies and drills; make needed changes.
- If objects are at risk, identify emergency response trigger points to determine proper course of action to either (1) shelter collections in place; (2) evacuate collections to another area in the park; or (3) evacuate collections outside of the park. If collections are to be removed, if possible, secure temporary area and maintain a stable temperature and relative humidity as similar as possible to those that existed before the disaster. Identify trigger points, based on measurable factors such as:
 - Fire or other hazard behavior
 - Hazard location and boundaries
 - Time constraints, time of day
 - Weather conditions
 - Time, distance, and access to safety zone (e.g. temporary museum storage facility)
 - Condition of safety zone
 - Adequacy of fire suppression or other hazard response resources
 - Communication limitations

- When predetermined trigger points are approached, identify a Risk Management Process to help decide response tactics:
 - Identify hazards.
 - Assess hazards.
 - Develop controls and make risk decisions.
 - Implement controls.
 - Supervise and evaluate.
- Identify command/leadership responsibilities when implementing response tactics:
 - Communicate changes to your subordinates, adjacent forces, and up the chain of command.
 - Account for all your people.
 - Make sure everyone knows and follows the plan.
- All Salvage procedures must be coordinated with security and/or Incident Command, depending upon the emergency. There may be a need to arrange for extra security.
- Refer to Role and Function Statements for guidance in activities, and follow the emergency chain of command, as nearly as possible. It is important that all activities be channeled through the Museum Emergency Plan Coordinator, so that efforts can be fully coordinated. Before taking any action, the situation must first be assessed, actions planned and prioritized, and then work commenced, following the plan of action.
- When moving objects that are at risk, give priority to undamaged materials.
- If undamaged materials are not at risk, leave them in place.
- If no part of the building is secure, protect damaged and undamaged objects where they are with whatever materials are available (e.g., plastic sheeting) until secure space can be found in another building. Then move the collections as quickly as possible.

EXAMPLE of Museum Collection Protection Measures for Wildland Fire:

- Maintain communication with pertinent museum, fire, and/or IC staff to identify fire and smoke progression timeline and location.
- Communicate all known collection hazards to fire response personnel:
 - flammable/combustible nitrate negatives are located in freezer in Room XYZ
 - alcohol specimens are located in Room ABC
 - small arms ammunition is located in Room X
- If fire is within x miles of facility – shelter collections in place. Monitor smoke and soot conditions; Respond as needed to mitigate damage from smoke and soot.

- If fire is within x miles and park facility is out of danger of fire - evacuate (identify some or all collections; Identify specific collection types/ objects that must be removed based on Priority I designation such as Native American baskets) collections to park facility Y
- If fire is within x miles of facility and Y park facility is in danger of fire or unavailable – evacuate (identify some or all collections; Identify specific collection types/ objects that must be removed based on Priority I designation such as Native American baskets) collections to non-NPS facility Z.
- Initiate dialogue with PWR Museum Program Manager and, as needed, the Harpers Ferry Conservation Laboratory personnel or other potential partners to obtain guidance on further object-related actions (e.g., cleaning, packing, and moving to more secure location, stabilization, repair), as needed.
- If fire hoses were deployed and the museum collection (in a facility) got wet, carefully review, and follow the recommended procedures for recovering wet collections (depending upon the type of object/material).

EXAMPLE of Museum Collection Protection Measures for Severe Weather

Including: tornado, microburst and derecho events; thunderstorms with heavy rainfall, related water leaks; heavy snow and ice storms; flooding

- Maintain communication with pertinent museum and/or IC staff.
- Shelter collections in place.
- Ensure and utilize proper, on-site emergency response supplies and equipment.
- Ensure all items are off the floor. Cover shelving and objects with plastic sheeting.
- After event, take only those steps needed to avoid or reduce additional damage - cover items and cabinets or shelves with plastic sheeting or tarps; carefully move materials from the area. Do not remove wet books from shelves.
- After leaks or flooding (e.g., flooding may be from broken water pipes) have been controlled, take immediate steps to eliminate as much water as possible:
- Use “wet” vacuums to suck up small amounts of water; Sump pumps may be needed for large amounts of water.
- Place dehumidifiers in the affected areas to draw as much water out of the air as possible and to retard mold growth.
- If plastic sheeting was deployed and it did get wet, be extremely careful when removing it from the exhibit cases, books shelves and furnishings to ensure no water runs off onto the books, furniture, paintings, or other furnishings.
- Initiate dialogue with PWR Museum Services Program staff to obtain guidance on further object- related actions (e.g., stabilization, restoration, and repair).

Section 5 – Inventory and Location(s) of Museum Emergency Supply Cache Equipment, Supplies and Vendors

- Update equipment and supply lists on a regular basis, at least annually.
- Purchase additional supplies if necessary and as the budget will allow.
- It's important to identify local support—supplies, expertise, materials conservators, volunteers—for immediate help.
- Examples of Standard Emergency Supplies:
 - Wet/dry Vacuum
 - HEPA Vacuum
 - Large, lidded storage bins with lids
 - bubble pack, expanded polyethylene sheeting, woven polyester batting, and/or volara sheeting
 - Work lights – may need to battery powered
 - Plastic record and legal-size storage boxes with lids
 - 50ft. and 25ft extension cords
 - Durable work gloves
 - Disposable latex or nitril gloves
 - Plastic sheeting, 12 x 100 ft, .31 mil and 10 x 25 ft, 3.5 mil
 - Terry towels or equivalent
 - Maglite flashlight and batteries
 - Dust masks
 - Blue 2” wide painters’ tape - used to label boxes, bins, totes, etc. with catalog # info
 - Caution tape
 - Duct tape
 - Headlamps
 - Backup security screwdriver/heads to access exhibit cases
 - Suction Cups (w/handles) to lift heavy vitrines (as needed)
 - Clipboards, copies of Standard Museum Forms, paper/pencils

Potential vendors to assist with recovery of museum collections following a disaster

A Disaster Recovery Contract is usually not in place at the time a disaster occurs and will have to be instituted on an emergency basis after a disaster has occurred. The Incident Commander will have to work with the Procurement Office to put such a contract into place.

Time is critical in a disaster. The faster the contract can be placed, (within 24 to 48 hours), the more likely that the facility can be stabilized and the disaster recovery of collections started. The longer the wait **the higher the recovery cost** and the less chance that recovery efforts will be successful.

A Disaster Recovery Contract should include vendor qualifications, scope of work, and suppliers for:

- Cold storage, dehumidification services, fire & water recovery, mold, vacuum freeze-drying, and pest management
- Environmental supplies, testing, and advice
- Water alarms and sensing devices
- Equipment - carts, boxes, trucks, conveyor belts, ladders, shelving, warehouse services
- Moving companies
- Safety supplies & equipment
- Rental vehicles - vans, SUVs, moving trucks
- Commercial off-site storage locations
- NPS off-site storage locations
- Other federal, state, local off-site-storage locations

Section 6 - Museum Collection Priority Designations

- Prioritize objects and archival materials for added protection or immediate salvage in case of an event.
- List any special concerns or precautions for specific objects.

Priority designations are based upon several factors including known site-specific historical connections, rarity, component materials, overall fragility, general historic or park resource significance, and site-specific environmental conditions.

Prioritize museum collection items that are of special significance that require evacuation or otherwise additionally protected when preparing for, during, or recovering from an emergency. Use the following priority designation ‘colors’ to be consistent with ‘Incident Command’ protocols (Table C1).

Table C1. Example of Collections Prioritization (SEKI).

Site	Location	Collections in this Area	Resource Protection Measure PRIORITY
Ash Mountains Visitor Center	Exhibit Area	Historical, archeological, geological, and natural history specimens	Priority III
Ash Mountains Storage Facility	Curatorial Storage Areas	Ethnographic, NAGPRA, archeological, historic, archival, photographic, paleontological objects	Priority I Priority II Priority III
Ash Mountains Maintenance Area	Curatorial Storage Area	Historic architectural components	Priority III

Section 7 – Attachments and References

- Use this section to add attachments and references that support this LURG for Museum Collections.
- PWRO museum staff can provide copies or access to the following as needed.
- Use hyperlinks as much as possible; links should be checked and updated as necessary.
- Forms: Disaster Prevention and Preparedness Periodic Checklist; Field Assessment Form; Rapid Collections Assessment Form; Disaster Recovery Object Form
- Post Emergency Critique Information
- Identifying and Assessing Risks to Park Museum Collections: A tool for self-assessing park facilities with museum collections
- Additional park museum site, facility, or collection images, drawings, or floor plans
- Consumer Product Safety Commission Safety Alert – (portable generators)
- Examples: Disaster Recovery Contract; Shopping List; Response Equipment Vendors
- Emergency Response Quick Guide
- Reference Materials:
 - Museum Collection Salvage Procedures and Resources
 - Policies and Procedures
 - Emergency Operations Guidelines
 - NPS Museum Handbook Chapters

- Park Museum Collections Emergency Operations Plan (MCEOP) or similar plans
- Emergency Training and Evaluation

Appendix D. Additional References for Tribal Interests, Traditionally Associated Communities, Native Hawaiians, and Alaska Natives

The following appendix presents general steps to foster open and effective communication between NPS and Tribal representatives during a wildland fire or other hazard incident. The recommendations and procedures outlined below are by no means exhaustive in scope. They are intended as a communication and consultation baseline for establishing points of contact between the NPS and Tribe(s) to ensure Tribal concerns are given voice and incorporated into protection and response measures. It is also important to recognize that the information presented in this section should not be viewed as a stand-alone portion of the LURG that is addressed after the LURG is completed. Rather, Tribes should be offered a seat at the table early in the LURG development process. Tribal concerns should be incorporated throughout the document for identification of sensitive resources, development of RPMs, and post-incident response where applicable. [Link](#) to Tribal Interests section.

Revisit the following tasks annually or as needed by park and Tribal leadership.

Preparedness Planning

- Identification of Tribal Partners, Traditionally Associated Communities, Native Hawaiians, and Alaska Natives, as appropriate: The information below should be collected for each Tribe with interest in the lands managed by the NPS unit.
 - Name and contact information for Tribal Leader
 - Name and contact information for Tribal Historic Protection Officer (THPO) (if applicable) and/or Tribal cultural resource contact.
 - Name and contact information for Tribal nature resource contact
 - Name and contact information for Tribal fire or emergency response contact.
 - Park/Tribe Interaction Protocols
 - Review existing agreements and consultation protocols
 - Inadvertent discovery of human remains or cultural items (as defined by 43 CFR 10.2)
 - Consider developing a comprehensive Native American Graves Protection and Repatriation Act (NAGPRA) agreement to address potential inadvertent discoveries
 - Establish process for data management of Tribally sensitive data
 - Determine what general types of information are suitable for mapping
 - Discuss Tribal perspectives and approach to fire management
 - Wildland fire management for cultural purposes

- Potential desired outcomes from fire
- Identify areas of management interest to Tribe
 - Entire park or a portion of the park
 - Potential management actions and response tactics
 - Identify general resources of interest to the Tribe
 - Natural resources of concern
 - General location or occurrence within the park
 - General recommendations regarding incident response
 - ◆ Avoidance strategies
 - ◆ Treatment strategies
 - ◆ Mitigation strategies
 - Cultural resources of concern
 - General location and occurrence within the park
 - General recommendations regarding incident response
 - ◆ Avoidance strategies
 - ◆ Treatment strategies
 - ◆ Mitigation strategies

Incident Response

- Review/develop incident response specific consultation procedures, by Tribe
 - Identify primary points of contact for incident
 - Tribal Point of Contact (POC)
 - Park POC
 - Incident command POC
 - Establish process for information flow between POCs
 - Confirm process for data management of Tribally sensitive data
 - Confirm types of information suitable for mapping
 - Consider Tribal perspectives and approach to fire management
 - Identify potentially impacted high priority locations for the Tribe
 - Can these areas be designated on maps?
 - Specific recommendations for incident response

- Avoidance strategies
 - Treatment strategies
 - Mitigation strategies
- Identify potentially impacted resources of concern to Tribe
 - Natural resources of concern
 - Location or occurrence within the park
 - ◆ Can these resources be designated on maps
 - Recommendations regarding incident response
 - ◆ Avoidance strategies
 - ◆ Treatment strategies
 - ◆ Mitigation strategies
 - Cultural resources of concern
 - Location and occurrence within the park
 - ◆ Can these resources be designated on maps
 - Recommendations regarding incident response
 - ◆ Avoidance strategies
 - ◆ Treatment strategies
 - ◆ Mitigation strategies

Appendix E. Catalog of Potential Designated Lands Resource Protection Measures

This catalog is presented as a catalog of resource protection measures (RPMs) that units might consider for inclusion in their LURG. These recommendations are by no means exhaustive in scope. They are offered as a “tickler list” of examples of commonly used RPMs and to prompt units to develop and customize protection measures which meet local protection measures and are operationally feasible. Units are encouraged to write their RPMs using clear and specific language which will be understandable to all operational personnel. [Link](#) to Specially Designated Lands section.

Specially Designated Lands

- [National Trail Systems](#)
- [Research Natural Areas \(RNAs\)](#)
 - **Intent of designation:** Research Natural Areas (RNAs) are administratively designated areas identified for their prime examples of natural resources and processes. RNAs were so designated by a variety of federal land agencies due to their unique natural features and minimal human impact. They were established to provide examples of undisturbed ecosystems for scientific research. The intent of RNAs is to minimize human disturbance of any type.
 - **Required approvals for operational actions**
 - **Resource protection measures**
 - Avoid the establishment of spike camps in RNAs
 - Use the RNA Management Plans resource protection measures
- [Wild and Scenic Rivers](#)
 - **Intent of Designation:** The National Wild and Scenic Rivers System was created by Congress in 1968 to preserve certain rivers with outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations. Rivers may be designated by Congress or, if certain requirements are met, the Secretary of the Interior. Each river is administered by either a federal or state agency.
 - **Required approvals for operational actions**
 - **Resource protection measures**
- [Wilderness](#) and [other Wilderness Categories](#) (spreadsheet)
 - **Intent of designation:** The Wilderness Act of 1964 was enacted to protect federal wilderness and create a formal mechanism for designating wilderness.

- Establish the National Wilderness Preservation System for the permanent good of the whole people.
- Direct federal land management agencies to manage officially designated wilderness areas in a way that preserves their wilderness character.
- Restrain human influences within wilderness areas to allow ecosystems to change over time without human manipulation.
- Provide the highest level of protection for America's wild landscapes.
- Preserve and protect natural ecosystems and wild areas, while also providing opportunities for solitude and primitive recreation
- Required approvals for operational actions
 - [Minimum Requirements Analysis \(MRA\)](#)
 - Use of mechanized equipment
 - The use of any vehicles or mechanized equipment in wilderness will require pre-authorization for the Park Superintendent.
 - Minimize the landing of helicopters in Wilderness, to the greatest degree feasible.
- Resource protection measures
 - Incident personnel will follow Leave No Trace (LNT) practices, to the greatest degree possible.
 - Utilize natural containment features in lieu of constructed handline to the greatest degree possible.
 - Align saw cuts away from trails and visible areas.
 - Locate spike camps outside of Wilderness whenever possible.
- **Spike camps** (see Spike Camps in Natural Resources section)

Appendix F. READ Atlas Job Aid

A guide to planning and developing a local unit READ Atlas



Resource advisors meet around a map during the Washburn Fire in Yosemite National Park.
NPS/Yosemite Fire and Aviation Management Program

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Purpose

This job aid is intended to guide a GIS practitioner in creating a local unit Resource Advisor (READ) Atlas. The intent of a READ Atlas is to provide a map (or set of maps) and geospatial data of a unit's sensitive natural and cultural resources, specially designated lands, infrastructure, and utilities to inform how to protect them (e.g., "no dip" lakes) via resource advising on incidents. If NPS units are not familiar with the concept and practice of Resource Advising, this [five-minute video](#) provides an introduction.

Units are encouraged to develop a READ Atlas as a preparedness measure for protecting their sensitive resources and infrastructure, ideally alongside efforts to develop a Local Unit READ Guide (LURG) and/or incident pre-plan. There are no standards or requirements for READ Atlases, so units have autonomy to customize the content, style, and format to suit their situation and potential incident scenarios. This job aid provides orientation, recommendations, examples, and templates for planning and ultimately developing a READ Atlas that, however configured, meets the following benchmarks of success:

- **Map information is complete, accurate, and readable.** The READ Atlas provides spatial information that may be critical for effective resource advising.
- **Legally protected/confidential information is secured.** The READ Atlas is managed to appropriately restrict access to sensitive data.
- **Deployment is timely.** The READ Atlas is available when it needs to be used by the READs, fire managers, and unit staff who should have access to it, which may be on short notice due to emergency response.

A basic READ Atlas should cover where things are located that need to be protected, avoided, or planned for; where certain activities are permitted, restricted, or not recommended or certain protective measures are needed; relevant reference information; and relevant hazard and safety information. Map(s) along with at least two data packages, sensitive and non-sensitive, should be prepared in such a manner that they are ready to support resource advising on planned or unplanned incidents.

The objective is to stage READ maps and data in a secure manner to protect sensitive information but also to make these products ready to deploy on an incident. A READ Atlas is a living product that can start out basic and improve over time. It is highly recommended to create one before it is needed with the intent that it will be refined and adapted.

Terminology and Acronyms

ArcGIS Pro Project (APRX): A file that contains a collection of related items such as layers, maps, layouts, item connections, and many other resources that contribute to a common purpose. Definition source: [Esri](#)

Incident: An occurrence, either human-caused or by natural phenomena, that requires action by emergency service personnel to prevent or minimize loss of life or damage to property and/or natural resources. Examples: wildfire, prescribed fire, hurricane, flood, eruption, snow event, tornado, oil spill, solar eclipse, marathon. Definition source: [USDA](#), [FEMA](#)

Incident Management Team (IMT): A team of incident-qualified individuals dispatched or mobilized during complex emergency incidents to provide a [command-and-control infrastructure](#) in order to manage the operational, logistical, informational, planning, fiscal, community, political, and safety issues associated with complex incidents. Definition source: [Incident Management Teams \(nifc.gov\)](#)

Local Unit READ Guide (LURG): A reference document that identifies specific and general resource protection measures (such as Minimum Impact Strategies and Tactics, WFDSS Management Requirements, and suppression repair requirements) to inform the avoidance, minimization, or mitigation of impacts to sensitive values within the context of incidents.

Mobile Map Package (MMPK): A single file created from an ArcGIS Pro map containing consolidated maps that can be copied directly to a mobile device to use in ArcGIS Field Maps. Definition source: [Esri](#)

Resource Advisors (READs): Operational personnel assigned to incidents to provide information and technical expertise for the prevention, minimization, or mitigation of impacts to sensitive natural and cultural resources, specially designated lands, and infrastructure and utilities.

READ Atlas: A set of maps and geospatial data of sensitive natural and cultural resources, specially designated lands, and infrastructure and utilities and/or resource protection measures intended to support resource advising.

Wildland Fire Decision Support System (WFDSS): A data-rich, map-centric application that graphically displays information to provide as much information as possible to agency administrators, line officers, fire managers, and analysts as they move through the risk informed decision process for wildland fire. Definition source: [WFDSS \(wildfire.gov\)](#)

Project Overview

This section provides a high-level overview of the process and desired outcomes for developing a READ Atlas.

Deliverables

Begin with the end in mind! By the end of this project, units will have created 6-7 deliverables:

1. Atlas

- One or several maps to help READs prevent, minimize, or mitigate impacts to sensitive natural and cultural resources, specially designated areas, and infrastructure and utilities during planned or unplanned events
- Atlas can be electronic, hard copy, or both depending on anticipated unit needs.
- Ready for “off-the-shelf” use to support resource advising

2. Data Package

- One or more layer, map, or project [packages](#) of all the data symbolized in the maps as well as other relevant spatial datasets
- Ready for “off-the-hard drive” sharing with READs and ARCHs and non-sensitive data ready for sharing with an Incident Management Team (IMT)

3. ArcGIS Pro Project

- The [Pro project](#) used to create the READ Atlas and data package
- Maintained so the atlas can be updated over time

4. READ Dataset Inventory

- A spreadsheet of the datasets in the READ Atlas and data package and their sources

5. Documentation

- A project completion report
- One or more SOPs on how to use, share, update, and maintain the READ Atlas

6. Project Folder

- One electronic folder containing the Pro project, products, documentation, and other related files

And potentially also:

7. GIS Data

- One or more spatial datasets for resource advising (if they do not exist yet), e.g., avoidance areas, no-dip waterbodies, etc.

The GIS practitioner developing the READ Atlas should not be the one to decide what to include in it. Conduct scoping with the unit's resource and facility specialists on map needs and what essential information they would want READs to have on their maps to be able to advise effectively on cultural and natural resources, designated lands, and facility and utility infrastructure protection during an incident. [Appendix G., Potential READ Atlas Content](#), identifies types of geospatial content which may be included in a READ Atlas.

Develop several drafts of the map(s) for internal review. Once finalized, export the map(s) and data packages for staging so they are ready to deploy during an incident. After a deployment, conduct an After Action Review (AAR) to identify gaps and improve the atlas for next time (Figure F1).

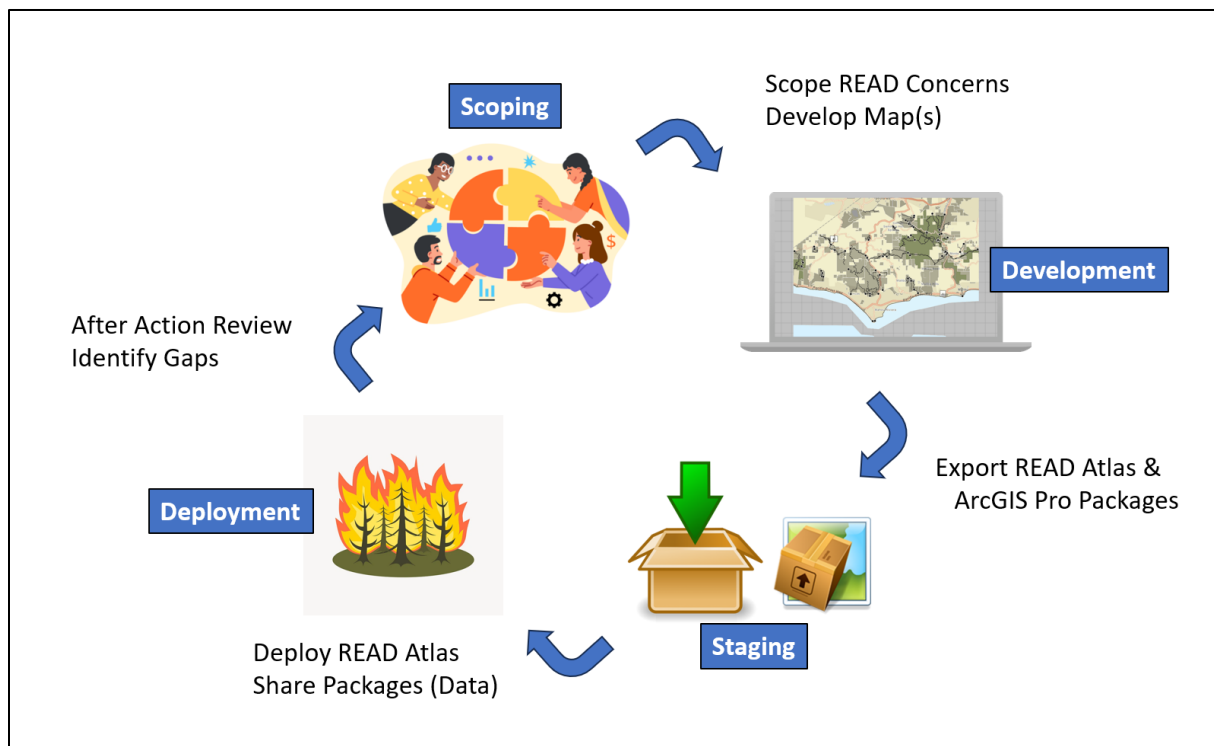


Figure F1. The process of developing a READ Atlas.

Decision Points

Who to involve: The READ Atlas should not be developed in a vacuum. Input from resource management, fire, facilities, and others involved in park management or incident response is essential to creating an atlas that contains the information that would be needed on an incident.

What maps to create: Each NPS unit should evaluate which map options best suit their needs relative to likely incident responses. Factor in resource complexity and what type of maps can be readily deployed and kept current by local staff. See Map Options and Map Considerations sections below.

What data to include and/or develop: Find the balance between minimalism and information overload. Coordinate with resource specialists to ensure that the resources and assets identified in the atlas are the highly valued ones. Start with the highest priorities because more can be added later. See Data Considerations and Potential READ Atlas Content sections below.

How to present the data: Symbolize, label, and arrange each map layer in order to quickly communicate clear and appropriately emphasized information in the atlas. See Symbology and Labels section below.

How to protect sensitive/confidential information: Discuss and reach agreement with sensitive data stewards about what measures to put in place to protect confidential information. See Sensitive Maps and Sensitive Data sections below.

Where to stage the project and the READ Atlas: Select approved digital and/or physical locations for the atlas to reside where it can be accessed when needed; particularly under possibly challenging conditions such as evacuations, power outages, unavailable staff members, etc. See Sharing and Staging section below.

How to share the READ Atlas: Determine who is responsible or allowed to share the atlas, under what conditions or criteria, and with whom. See Sharing and Staging section below.

How to maintain the READ Atlas: Determine the procedure and who is responsible for keeping the atlas and data up to date. See Future Updates section below.

Map Options

The workgroup that developed this job aid reviewed multiple examples of READ maps in early 2024 and classified those into five styles, each with their benefits and limitations as described in this [13-minute video](#) and in Table F1.

Table F1. Comparison of READ Atlas map options.

Map Option	Content	Format	Sensitivity	Recommendation
Mobile Map Package	Comprehensive	Mobile	Sensitive	Primary Option
GeoPDF/Map Book	Comprehensive	Mobile, Digital, Print	Sensitive	Primary Option
Map Collection	Subject-Specific	Mobile, Digital, Print	Sensitive and Non-Sensitive	Primary Option
Operational Map	Operational	Digital, Print	Less Sensitive	Secondary Option
Web Map	Comprehensive	Web (Internal)	Sensitive	Secondary Option

A READ Atlas can be produced in several formats for maximum effectiveness, e.g., a mobile map package and a web map. One of the “primary options,” a mobile map package, GeoPDF/map book, or map collection, are recommended to choose between if a READ Atlas will only be produced in one format. Any of the primary or secondary options, which include an operational map and/or web map, can be valuable for a READ Atlas being produced in multiple formats.

Mobile Map Package (MMPK)

A [mobile map package](#) is an MMPK file created from an ArcGIS Pro project. It is an offline, mobile, and typically comprehensive map of resources and assets to protect. An MMPK is both a mobile map and a data package which can be used on a phone or tablet in the ESRI Field Maps application without a sign in requirement or opened in ArcGIS Pro with the Import Map button. It has higher functionality than a static electronic product (i.e. PDF Map used in the Avenza App) in that users can view attribute data of map features and turn layers on and off. Additionally, unlike cloud-based resources such as web maps, MMPKs can also contain sensitive data and still be used in Field Maps since they have the ability to be side-loaded on mobile devices, password protected and set to expire.

An MMPK is a good option for units with a high density of resources and assets to protect, information-rich READ data with well-developed attributes and/or image or document attachments, and/or strong potential for incidents involving IMTs, READs, and ARCHs coming to the park on an incident assignment.

Pros

- Used in Field Maps (including with sensitive data), which is a widely used mapping application by fire personnel on IMTs.
- Portable. Maps can be sideloaded, Airdropped, or downloaded from a secure SharePoint link.
- Expirable. Setting an expiration date (requires Publisher licensing in ArcGIS Pro) can be a safeguard against sensitive data lingering on a mobile device and users working with an outdated map.
- Great for information-rich READ data; can provide attribute details and attachments for resources and assets to protect, configure or disable pop-ups, and/or make the map searchable.
- Great for a READ map with a lot of layers, as map clutter can be managed by group layers to turn on/off and setting map layer and label visibility based on zoom level.
- An MMPK file serves as both a mobile map and data package for sharing information.
- Comprehensive, single map product for READs.

Cons

- Requires more advanced ArcGIS Pro skills to create and maintain.
- Not a printable map product.
- Making it expirable commits a unit to periodically re-creating the MMPK.
- Comprehensive map may require annual update to maintain.
- An MMPK can be large depending on attachments and basemaps (>100 Mb), which may be problematic if distributed as a downloadable file in an environment with poor connectivity.

- The Create Mobile Map Package tool in ArcGIS Pro has some very particular requirements, e.g., no joins, and occasions when the tool fails to run can be tedious to resolve or troubleshoot.
- Can be time consuming to export.

Options for MMPKs:

- Combine cultural and natural resources in one MMPK or produce separate MMPKs, depending on the NPS unit's preferred approach to managing data shared with ARCHs versus READs.
- Make the map searchable by [creating a locator](#), e.g., ARCHs may find it helpful to search for known sites by site number, READs may find it helpful to search local placenames in a unit with a lot of backcountry.
- Limit how long a map stays available for incoming READs by setting an expiration date (requires Publisher licensing in ArcGIS Pro) after which the MMPK file can no longer be opened. Stage multiple MMPKs with different expiration dates.
- Include attachments where they will be helpful in the field, e.g., photos of nest trees or species resource briefs.
- Include topographic, imagery, or other basemaps using tile packages (TPKs) or vector tile packages (VTPKs) and their reference online content.
- Create a web map from the same project for use on computers. See options and tips for web maps below.

Tips for MMPKs:

- Get started with the style files provided with this job aid.
- Manage map clutter by configuring map layer [visibility ranges](#) and label settings to allow layers and labels to hide or display at certain zoom scales. Group layers so they can be turned on and off together.
- Make attribute data viewable (or not) by [configuring or disabling map layer pop-ups](#). Layers that may not need pop-ups enabled may include park boundary, contour lines, and any layers where labels on their own are sufficient, e.g., trails, roads, etc. Manage attribute field clutter in pop-ups with field visibility settings; hide all but the essential fields that READs will need.
 - Heads up: Users who import an MMPK in ArcGIS Pro can access hidden fields by changing the field visibility settings of unpacked data. The only way to keep sensitive fields from being included in an MMPK is if they are removed from the data source in the ArcGIS Pro project used to create the MMPK.

- Manage MMPK file size by removing or downsizing attachments where possible.
- Put the expiration date in the map title and summary but set the actual expiration date a day or two after the advertised date to provide a grace period. Keep in mind the expiration date/time setting is in Coordinated Universal Time (UTC).
- TPKs or VTPKs used in the MMPK must be the same projection as the map.
- An MMPK that contains sensitive map layers may not be hosted on ArcGIS Online for sharing and distribution. However, it can be sideloaded, Airdropped, or downloaded from a secure SharePoint link on mobile devices to be used in Field Maps without a sign in requirement.

GeoPDF/Map Book

This style of READ Atlas may be a single georeferenced PDF (GeoPDF) or an indexed, multipage [GeoPDF](#) map book, depending on the size of the park and desired map scale. Like an MMPK, this option is typically a comprehensive map of resources and assets to protect. A GeoPDF can be printed or used on a phone or tablet in the Avenza Maps application.

A GeoPDF/map book is a good option for parks that want to ensure the availability of a printed map and/or prefer using the Avenza app.

Pros

- Usable in Avenza, which is a widely used mapping application that many in wildland fire are accustomed to.
- Portable. Maps can be sideloaded, Airdropped, or downloaded from a secure SharePoint link or QR code.
- Printable. Hard copies can be staged for deployment during power or connectivity outages.
- Comprehensive. Single map product for READs.
- Securable. Can require a password to open.

Cons

- Requires more advanced cartographic skills to be able to design effectively.
- Limitations of mapping at a fixed scale and communicating spatial information through just symbols and labels; possible information loss in crowded areas of the map where a high density of features results in overlapping symbols and labels (no access attribute data, no ability to turn layers on and off).
- Comprehensive map may require annual update to maintain.

Options for a GeoPDF/map book:

- Combine cultural and natural resources in one GeoPDF or GeoPDF map book or produce separate maps, depending on the local unit's preferred approach to managing data shared with READs versus ARCHs.
- Create a poster-sized PDF (common page sizes are recommended over custom dimensions-D: 24" x 36" or E: 36" x 48") and/or [map series](#).
- Create a [mobile map package](#) from the same project so the map can also be used in Field Maps. See options and tips for MMPKs above.

Tips for a GeoPDF/map book:

- Get started with style files and a Pro project template provided with this job aid.

Map Collection

This approach develops a READ Atlas as a collection of separate maps of relevant subjects for READs, e.g., invasive plants, cultural sites, historic properties, etc., rather than as a comprehensive map. Usually produced as GeoPDFs, maps in the collection can be printed or used on a phone or tablet in the Avenza app. However, a collection could contain a combination of formats, e.g., a cultural resources MMPK and several GeoPDFs.

A map collection is a good option for parks that may not have the GIS support to maintain a comprehensive, annually updated READ map or may prefer to have different specialists or departments responsible for certain maps in the collection. Many of the maps needed to address specially designated lands, priority resources and assets, or resource protection measures may already exist, and others can be produced to assemble a thorough collection for READ use. Only a few of such maps may need to be updated on an annual basis.

Pros

- Can be assembled from existing maps and gaps in the collection can be filled by creating additional maps.
- Some maps in the collection may not need to be updated often.
- Multi-purpose. Maps in the collection are not necessarily created solely for resource advising but may also be used for other needs, e.g., a cultural resources MMPK may be used by park archeologists throughout the year.
- Broader audience. In having separate maps, certain ones may be shared with specialists and managers in addition to READs, depending on their level of privilege to access sensitive information.
- Portable. Can be sideloaded, Airdropped, or downloaded from a secure SharePoint link.
- Securable. Can require a password to open.

Cons

- Information “silos”. In having to switch between separate maps, READs may miss seeing relationships or co-location of priority resources and assets and resource protection measures or may overlook a map they should have consulted.
- Requires strong coordination to ensure maps stay current and will meet READ needs.

Examples of map collections:

- Infrastructure: Backcountry structures, developed areas, utilities (see [eTIC2](#))
- Lands: Designated lands, ownership/jurisdiction (see [LandsNet](#))
- Cultural resources: Archeology MMPK, known cultural sites, museum and collections storage locations, cultural landscapes (see [cultural landscape inventories](#))
- Natural resources: Sensitive vegetation, invasive plants, vegetation plots and monitoring installations, sensitive wildlife and critical habitat, dip lakes and water sources, flood history and high-water marks, fire history, retardant avoidance areas, vegetation, geology, soils (see [natural resource inventories](#))
- General: Visitor/recreation (see [National Park Service maps](#))

Tips for a map collection:

- Create a table of contents and an inventory of the map collection and the source, date, sensitivity, access restrictions, point of contact, and other pertinent details of each map.
- Common page sizes are recommended for map layouts over custom dimensions- Letter: 8 ½” x 11” Tabloid: 11” x 17” C: 17” x 24” D: 24” x 36” or E: 36” x 48”

Operational Map

An operational map emphasizes the operational tactics recommended to protect resources rather than the identity of them. The audience is usually a wider group of responders, not restricted to READs. Examples include areas containing highly sensitive resources requiring protection, avoidance areas, pre-approved landing zones, no dip/no draft sites, etc., rather than the location of sensitive sites. Often a spatial buffer is included to avoid disclosing actual location information. For that reason, this type of map is recommended as a secondary option to supplement an MMPK, GeoPDF/map book, and/or map collection style of READ Atlas, since ARCHs and READs will still need to know the location of priority resources and assets. An operational map is usually a GeoPDF that can be printed or used on a phone or tablet in the Avenza app.

An operational map is a good option for parks that can translate what READs would advise onto a map for initial attack or initial response to an incident in the park. It is recommended for parks likely to have non-NPS personnel responding, like a local fire department.

Pros

- Less sensitive. can be shared with incident operations.
- Communicates basic measures for spatial resource advising when a READ is not available or involved.
- Used in Avenza, which is a widely used mapping application that many are comfortable with.
- Portable. Can be sideloaded, Airdropped, or downloaded from a secure Teams SharePoint link.
- Printable. Hard copies can be staged for deployment during power or connectivity outages.

Cons

- Incomplete information for READs. Sensitive resource and asset details that READs would need to know are not included.
- Can require significant scoping and input from resource specialists.

Examples of operational maps include dip/no dip locations, draft/no draft locations, no bucket drops, no water application, no ground disturbance, equipment staging areas, retardant avoidance areas, and/or restricted entry areas.

Web Map

A web map is a protected, online, typically comprehensive map of resources and assets to protect with dynamic map layers, meaning data stay current in the map. This could include priority resource and asset data being updated throughout the year as well as current fire locations, weather, smoke, stream gauges, power outages, incident event map layers, and more.

The only approved web platform for NPS units to host sensitive data is the [NPS Portal](#), making it the only option for a READ web map. Access to Portal is DOI only, which is why this style is recommended as a secondary option to supplement a READ Atlas. READs on assignment as [Administratively Determined](#) (AD) hires or from other agencies like the U.S. Forest Service cannot access a web map in Portal.

A web map is a good option for any park that has the GIS support to set up and maintain it.

Pros

- Map access can be managed for group membership to protect sensitive information.
- Data stays current.
- View incident and READ data together.
- Great for information rich READ data; can provide attribute details and attachments for priority resource and assets and configure or disable pop-ups.
- Great for a READ map with a lot of layers, as map clutter can be managed by group layers to turn on/off and setting map layer and label visibility based on zoom level.
- Comprehensive, single map product for READs.

Cons

- No access outside DOI.
- Susceptible to Portal, network, and power outages.

Options for a web map:

- Limit sharing of the map and its feature layers with one group or manage access with multiple groups, e.g., READ cultural, READ natural, etc., depending on the NPS unit's preferred approach to managing data shared with READs, ARCHs, and others.
- Configure the web map for data collection and/or [offline use](#).
- Put the web map into a [web app](#).

Tips for a web map:

- Manage map clutter by configuring map layer visibility ranges and label settings to allow layers and labels to hide or display at certain zoom scales. Group layers so they can be turned on and off together.
- Make attribute data viewable or not by [configuring or disabling map layer pop-ups](#). Layers that may not need pop-ups enabled may include unit boundary, contour lines, and any layers where labels on their own are sufficient, e.g., trails, roads, etc. Manage attribute field clutter in pop-ups with field visibility settings; hide all but the essential fields that READs will need.
- Ensure all attribute fields used in definition queries are visible in the layers published to Portal.
- Set map layer [refresh intervals](#) for dynamic content and/or a refresh interval for the entire map.
- Adhere to naming conventions in the [Acceptable Use Policy](#) (NPS 2024) for the web map and all its related items.

Map Considerations

Sensitive Maps

Maps with sensitive information that are shared or disseminated internally should be clearly identified with “Internal NPS Use Only – Not for Release” and “CUI//Limited Dissemination Control” markings on each page as required by the park’s “Protected Data Memo” (on the [NPS DataStore](#), NPS network access only if the park has one) and the [Controlled Unclassified Information \(CUI\) Program | U.S. Department of the Interior \(doi.gov\)](#). Include a sensitivity label in the file name of each map product with sensitive information, e.g., SENSITIVE, or whatever term the park prefers. Configure a splash screen on sensitive web maps with appropriate [terms of use](#). Keep sensitive maps

in a separate location from non-sensitive maps where they can be protected from unauthorized access or release.

Accessibility

Design READ maps to meet accessibility requirements under Section 508 of the Rehabilitation Act. Use accessible font and font sizes and the ArcGIS Pro [Color Vision Simulator](#) and do not rely on color alone to communicate map information. Detailed guidance is available at [Cartography and Web Mapping Subcommittee GISC \(sharepoint.com\)](#).

Symbology and Labels

There are no standards for cultural and natural resource symbols in READ Atlases, and symbol and label decisions can be the most time-consuming part of developing READ maps. For this reason, several style files are provided with this job aid. Consider using symbols of a similar theme for data of a similar theme to help differentiate many types of features on the same map, e.g., historic layers in brown, vegetation layers in green, nest sites as triangles.

Use these symbols from [NWCG Standards for Geospatial Operations](#), PMS 936 (GeoOps), if including these features in the READ Atlas:

- [Point symbols](#): Aerial Hazard, Airport, Bridge, Culvert, Dip Site, Fire Station, Gate, Hazard, Helibase, Helispot, Hydrant, Restricted Water Source, Unimproved Landing Area
- [Line symbol](#): Fence
- [Ownership colors](#): Interagency standard colors for mapping federal ownership

Latitude and longitude coordinates when provided on maps related to fire and aviation are typically in degrees-decimal minutes.

File Names

Prefix file names with the park's NPS four-letter alpha code in its nps.gov web address. Consider adopting elements of [file naming standards](#) from GeoOps to READ Atlas MMPK, GeoPDF, ArcGIS Pro project, and data package files. This may include map dimensions (if relevant), output settings in terms of dots per inch (dpi), and date created in YYYYMMDD format. Avoid using existing "product type" codes or short names from GeoOps since they refer to standardized incident map products; consider coming up with new ones, e.g., readatlas, betstructures, etc.

Future Updates

Likely one or more READ maps will require future updates. Set up the READ Atlas project folder and its contents in a structured way so that a future GIS practitioner will be able to open and update them. Include documentation in the project folder that covers project background and points of contact, technical project setup, files, data sources and processing steps, map and data package export settings, and a procedure for performing map updates. Specify who is responsible for what and how often what maps or content must be updated.

Data Considerations

Determine what geospatial datasets are needed for the READ Atlas based on what the sensitive natural and cultural resources, specially designated lands, infrastructure, utilities, and their protection measures are and what essential information the facility and resource specialists want READs to have on their maps. Create a spreadsheet to inventory the dataset name, location (folder path or server), data steward or point of contact, and whether it is sensitive or not for each map layer in the READ Atlas.

The following datasets are recommended to be developed for the READ Atlas if they do not exist yet:

- Collection and museum storage locations and treatments: Work with the museum curator to identify the structures or buildings these are in and their treatment plans in a map layer along with any other information they want READs to have during an incident.
- Critical utility infrastructure: Many parks lack utility data in their GIS. The utility infrastructure that would be relevant to resource advising during an incident varies by park but may include fuel tank locations, lift stations, emergency shut-off valves, hydrants, fire department connections (FDCs), underground infrastructure, and more.

For parks with wildland fire potential:

- Dip/no dip and draft/no draft sites (tiered by level of approval): Work with fire management, aquatic biologists, and other subject matter experts to identify waterbodies and waterways where dipping and/or drafting may occur, would require review/approval before being used, or should not occur.
- Retardant avoidance areas: Work with cultural specialists and biologists to develop a layer to represent areas to avoid applying retardant, including sensitive cultural resources, known areas of threatened, endangered, proposed, candidate, and sensitive species, and water features. Recommend modeling this dataset after U.S. Forest Service standards, which includes 300 feet from water features and differentiating terrestrial and aquatic avoidance areas (see [Interagency Wildland Fire Chemicals Policy and Guidance | US Forest Service \(usda.gov\)](#) and [USDA Forest Service FSGeodata Clearinghouse - Download National Datasets](#)).

Consult the list of potential READ Atlas content in Appendix G of this document for other map layers that may be critical to include or develop if relevant.

As much as possible, work within the park's established GIS to update or modify existing datasets and integrate new data gathered or created for the READ Atlas, rather than creating duplicate datasets or standing up a separate GIS for the atlas. Add data to the READ Atlas ArcGIS Pro project(s) from the park's GIS where they are more likely to be maintained and updated over time.

The larger framework of a park's GIS includes the [NPS National Geospatial Program, Official Service-wide Datasets](#), and [Spatial Data Standards](#). If a park does not have a local GIS specialist to connect with, reach out to the [regional geospatial coordinator](#).

Sensitive Data

The protection of sensitive data, which includes classified and [controlled unclassified information](#) (CUI), information prohibited from release by law, and other data protected from release when doing so will result in harm, theft, or destruction of the resource, is paramount. Sensitive data may concern the nature and specific location of endangered, threatened, rare, commercially valuable, mineral, paleontological, or cultural patrimony resources such as threatened or endangered species, rare features, archeological sites, museum collections, caves, fossil sites, gemstones, and sacred ceremonial sites as well as critical infrastructure. The list of potential READ Atlas content in Appendix G of this document identifies map layers typically deemed “sensitive.”

Safeguarding sensitive data requires compliance with law, policy, and internal guidance. Such safeguards involve establishing trust with sensitive data stewards so the READ Atlas can include a comprehensive scope of spatial information. Keep sensitive data in separate folders and geodatabases from non-sensitive data where they can be protected from unauthorized access or release. Sensitive data shared in a READ Atlas should be limited to just the details relevant for resource advising concerns. Certain features, attributes, or related records in the data may be withheld if there is no “need to know.”

No personally identifiable information (PII), CUI, sensitive data, or data that could be considered sensitive are permitted on the [NPS](#) or [NIFC ArcGIS Online](#) (AGOL) organization, regardless of any local decision about sharing that information. A READ Atlas containing sensitive data may not be published or hosted on the NPS or NIFC AGOL to be used in Field Maps or any web map, web app, group, or account, regardless of the [sharing status](#) of those items. Sensitive data are allowed in [NPS Portal](#), but use of Portal is limited to DOI only ([Acceptable Use Policy](#); NPS 2024) ([Rules of Behavior and Publishing Guidelines](#); NIFC AGOL 2023).

Data Standards

In the process of compiling and developing READ Atlas data, consider the following geospatial data standards:

- [NPS Core Data Standard](#): Apply the core or parts of the extended core to new and existing NPS geospatial datasets to include feature-level metadata fields, i.e., Map Method, Map Source, Source Date, Data Access, Public Display, Unit Code, Unit Name.
- [NPS Layer Naming Conventions](#): Note that parks may be using their own internal layer naming convention, which may be different or modified.
- [Geospatial Metadata](#): Create or update feature class or geospatial dataset metadata to meet minimum requirements. NPS typically uses the Federal Geographic Data Committee (FGDC) [Content Standard for Geospatial Metadata](#). Best practices for this are covered in [FGDC](#)

[Metadata Recommendations \(2022\)](#). Use the [NPS standard disclaimer](#) appropriate for the dataset in the “constraints” sections that cover the dataset’s limitations and terms of use.

- Wildland Fire Decision Support System (WFDSS): Use of this application is required for incident planning for fires that escape initial attack, exceed initial response, or if the management objectives contain elements of both protection and resource benefit. The app includes a map tool with GIS data services including infrastructure and many resource values and specially designated areas. While a login is required, sensitive data is not included. READ Atlas data may be needed to help with WFDSS decision making.
- “Highly Valued Resources and Assets (HVRA)” Data Standard: HVRA are landscape features that are influenced positively and/or negatively by fire and are important enough to influence management actions ([IFTDSS \(firenet.gov\)](#)). Resources are naturally occurring features (e.g., threatened and endangered species habitat), while Assets are human made (e.g., historic structures). This draft standard envisions a non-sensitive polygon dataset of HVRA based on specific resource locations but abstracted via buffering or other method to represent items not specifically referenced in the park’s Fire Management Plan but that affect wildfire response and fuel treatment planning. Polygons may depict what should or should not happen at the locations represented (e.g., reduce fuel load, flag & avoid, structure wrap, water line, wet line, mechanical line, hand line only, retardant avoidance, invasives mitigation, no resource protection needed, unevaluated). Polygons may also depict priority (e.g., critical, high, medium, low, none, unevaluated). Resource Protection and Priority attributes can be added to existing park datasets to record feature-level resource advising concerns. This standard is currently in development, not yet available for implementation, and may be subject to change.

Staging and Sharing

Data Packages

Create [data packages](#) so that READ geospatial datasets are ready to share in a format useable in GIS desktop software in addition to whatever maps comprise the READ Atlas. Data packages are recommended over zipped geodatabases because they can include symbol and label configurations, which can be a huge time saver on incidents and help the recipient wield the data correctly. ArcGIS Pro has several types of data packaging options; individual map layers or groups of map layers can be shared as layer packages, while map packages include map layout(s) along with all map layers. Remember that any map produced as a mobile map package (MMPK) is already packaged. Create additional data packages as needed for any supplemental datasets not included in a READ map.

GIS readiness for resource advising sits within a larger context of GIS readiness for incidents, emergencies, and natural disasters. An ideal scenario for a planned or unplanned incident would be to have non-sensitive data packages of the park’s geospatial base data and fire and aviation-related layers already staged for sharing with an incident management team (IMT) plans section or situation unit, while the READ Atlas and its specialized and/or sensitive data are also ready to support the resource advising response. Include a sensitivity label in the file name of data packages with

sensitive information, e.g., SENSITIVE, or whatever term the park prefers and keep those in a separate location from non-sensitive data packages where they can be protected from unauthorized access or release.

Staging Options

Consult with local unit resource managers as to where to keep the READ Atlas, in whole or in part, digitally and/or physically, so it is protected from unauthorized access or release but available when needed. Factor in the possibility that challenging conditions may exist during an incident, e.g., evacuations, power outages, connectivity, unavailable staff members, etc. Email limits file attachments to 25-40 Mb, which can also be a barrier for rapid data sharing. Personal OneDrive links are also not an option for non-DOI email recipients, though Teams OneDrive links may work depending on how the Team was created. Different data staging options have pros and cons as described below:

Local Unit Office (physical “READ Kit”): Print and place the READ Atlas on a mutually agreed upon shelf, lock box, locking file cabinet, or in an office. Include digital and/or non-printable files on [encrypted removable media](#) such as external hard drives or USB drives, which could include data packages, digitized site records, etc.

Pros

- Convenient, on site, offline.
- Protected under lock-and-key and encryption.
- Paper copy.

Cons

- Cannot access the READ Kit if office building is unreachable.
- READ Kit may go missing during office moves or remodels, staff turnover, etc.

Microsoft Teams: [Create a private Team](#) for staging and sharing READ Atlas files. Add individuals to the Team who are authorized to manage READ Atlas sharing. Team members can share file or folder links with internal or external users as well as revoke access when needed.

Pros

- Convenient, online.
- High availability, cloud storage, manage sharing remotely.
- Ability to share with non-DOI READs.
- Protected by a team, which can include park and non-park staff as appropriate.

Cons

- Requires Internet connectivity; may be difficult to download large file sizes depending on bandwidth.
- Inactive Teams may be deleted after a period of time unless renewed.
- Team storage may need to be periodically increased.

Park File Server (cloud or on premises): Place the READ Atlas on the park file server, perhaps along with other incident mobilization and readiness files. Work with IT specialists to apply necessary settings to limit access to folders containing sensitive information.

Pros

- Possibly more findable to park staff.
- Most appropriate file storage for READ Atlas project files in their entirety.
- Maintain data source links in ArcGIS Pro projects if sourced to data on same park server.

Cons

- Only IT can manage folder access controls.
- Difficult or impossible to share with non-park READs.

Regional Office: NPS regional offices may have resource advising, fire archeology, and/or GIS points of contact who could serve as repositories for the park's READ Atlas. Some regions are already compiling park-level READ materials in a file storage system that protects sensitive information from unauthorized access or release. Obtain concurrence from park resource specialists before proceeding.

Pros

- Regional point of contact may already be coordinating resource advising response for the park during an incident when park staff are tied up in other incident concerns, hard to reach, or evacuated.
- Continuity/institutional memory through park staff turnover.

Cons

- Possibly unknown security controls.
- Region may end up having an older READ Atlas if park forgets to share updated versions.

Mutual Aid Entities (non-sensitive READ maps only): An operational map may be shared with the mutual aid entities who would be responding to incidents in the park, so it is already in hand before the next unplanned incident. This may be a good option for small parks.

Pros

- Pre-emptively cover READ concerns and ensure mutual aid entities already have a map when they respond.

Cons

- Cooperator may end up having an older READ Atlas if park forgets to share updated versions.

Sharing Procedures

Determine ahead of time how the READ Atlas will be shared during an incident. Discuss who will be allowed to share what parts of the atlas with whom and under what conditions to minimize obstacles for effective use. Units may want ARCH data and maps to be shared differently than other READ

data. Special instructions may include “for use on incidents and emergency response only” or “to be shared only with qualified READs or ARCHs.” Specific procedures may need to be described such as [using a Microsoft Form and Flow](#) for requesting access, sharing or un-sharing files or folders through Teams, or using an encrypted hard drive. Incorporate the MMPK-to-Mobile Device SOP from Appendix H of this job aid if applicable.

NPS units may have a “Protected Data Memo” that specifies a written standard confidentiality agreement and disclaimer should be part of any transmittal of a protected dataset. For example:

Confidentiality Agreement: *I agree to keep confidential any protected information I may develop or otherwise acquire as part of my work with the National Park Service. I understand that with regard to protected information, I am an agent of the National Park Service and must not release that information. I also understand that by law I may not share protected information with anyone through any means except as specially authorized by the National Park Service. I understand that protected information concerns the nature and specific location of endangered, threatened, rare, commercially valuable, mineral, paleontological, or cultural patrimony resources such as threatened or endangered species, rare features, archeological sites, museum collections, caves, fossil sites, gemstones, and sacred ceremonial sites. Lastly, I understand that protected information must not be inadvertently disclosed through any means including websites, maps, scientific articles, presentations, speeches, or social media.*

Disclaimer: *The following files contain protected information. This information was provided by the National Park Service under a confidentiality agreement. It is not to be published, handled, re-distributed or used in a manner inconsistent with that agreement.*

Project Completion

At the end of project development, outcomes may take the form of a READ Atlas project folder with the ArcGIS Pro project(s), exported map product(s), data packages, dataset inventory, documentation, and other related files. Additionally, there should be a project completion report that summarizes basic information about the atlas (the where, when, why and who), methods (how and why), results (what), and other discussion, which may include project reflections, park-specific concerns, limitations, and future opportunities.

Appendix G. Potential READ Atlas Content

This appendix provides a list of potential READ Atlas map layers with some links to possible data sources.

This list is not comprehensive and is not intended to be used as a checklist of required content for planning a READ Atlas. It is provided to assist local units in considering options for their atlases. Units are recommended to consult this list only after scoping what essential information local resource and facility specialists wish READs to have available to them in order to advise effectively during an incident.

After a unit's sensitive natural and cultural resources, specially designated lands, infrastructure, utilities, and their protection measures have been identified, consider checking this list for other layers to include (or develop) if relevant and valuable for resource advising during incident response. Attempt to strike a balance between minimalism and information overload in READ Atlas content. Some layers may be useful to package and stage along with the READ Atlas for incident preparedness if not included in a map layout.

Resources data which might be considered as sensitive (requiring access restrictions) have been identified as “(sensitive)” in this appendix.

Aquatic Resources

- Anadromous Fish Watersheds
- Aquatic Wildlife [Critical Habitat](#)
- [Sensitive Aquatic Habitat](#) (wetlands, fens, meadows, vernal pools, springs, etc.)
- Coral Reefs ([NOAA Coral Reef Information System Regional Data](#))
- Critical Aquatic Refuges
- Known Site Locations for Special Status Aquatic Species (sensitive)
 - Amphibians
 - Fisheries
 - Invertebrates
- No Dip Waterbodies
- Retardant Avoidance Areas

Air Quality

- Class 1 Airshed
- Smoke Detection Receptors
- Non-attainment Zones
- Smoke Monitoring Sites and Equipment

Cultural Resources

- Archeological Sites (sensitive; [NPS Cultural Resources Inventory System](#))
- [Cultural Landscapes](#)
- Ethnographic Resources (sensitive)
- [Historic Districts](#)
- Historic “Classified” Structures (sensitive; [National Register of Historic Places](#))
- Historic Tree Blazes (sensitive)
- Museum Collections – see section below
- [National Historic Landmarks](#) (NHLs)
- [National Historic Trails](#) (NHTs)
- Retardant Avoidance Areas
- Sacred Sites (sensitive)
- Traditional Use Sites (sensitive)

Geologic Resources

- Caves/Karst Systems (sensitive)
- Geothermal Resources (sensitive)
- Lava Flows ([NPS Geologic Resources Inventories](#))
- Sensitive Soils (biological crusts, serpentine soils, permafrost etc.; [NPS Soil Resources Inventories](#))

Hazards

- Abandoned Wells, Cisterns, Cellars
- Caves and Lava Tubes (sensitive)
- Hazardous Soils (asbestos, etc.)
- Hazmat Sites
- Mines and Adits ([NPS Abandoned Mineral Lands](#) and [NPS Geologic Resources Inventories](#))
- Response Hazards (bridge limits, tunnel heights, seasonal hazards, etc.)
- Unexploded Ordinance (UXO; sensitive)

Infrastructure

- Buildings and Structures ([NPS Wildfire Risk Assessments](#) and [NPS Buildings](#))
- Cadastral Markers
- Dams and Reservoirs ([USACE National Inventory of Dams](#))
- Fencing and Gates
- Recreation Infrastructure ([NPS Points of Interest](#) and [NPS Places API](#))
 - Campgrounds and Associated Infrastructure (backcountry and front country)
 - Developed Recreation Sites (campgrounds, picnic areas, boat launches, beach areas)
 - Interpretive Sites and Exhibits
 - Trail Infrastructure (trailheads, bridges, shelters, toilets, etc.)
- Roads, Bridges, and Culverts ([NPS Road Centerlines](#), [FHWA Road Inventory Reports](#) and [FHWA RIP Map Services](#))
- Signage
- Trails ([NPS Trail Centerlines](#))
- Utilities ([DHS Homeland Infrastructure Foundation-Level Data](#); sensitive)
 - Communication Infrastructure (sensitive)
 - Emergency Shutoff Valves (sensitive)

- Fire Department Connections (FDCs), Hydrants
- Fuel Storage Tanks (sensitive)
- Lift Stations (sensitive)
- Municipal Water Supplies (sensitive)
- Pipelines (sensitive)
- Power Plants (hydro-electric sites, substations; sensitive)
- Utility Lines (sensitive)
- Water intakes, water transference systems, storage facilities (sensitive)

Invasive Species

- Aquatic Invasive Species (AIS) Presence (tiered by threat level)
- Terrestrial Invasive Species Presence (tiered by threat level)
- Invasive Pathogens Presence (tiered by threat level)
- Weed Wash Sites
 - Pinch points in road systems to site mobile wash station locations

Investments and Economic Values

- Agriculture (orchards, crop fields)
- BAER/BAR Treatments
- Grazing Allotments
 - Fences, Gates, Guzzlers
 - Stock Tanks (available for fire suppression)
- Invasives Treatments
- Restoration/Reforestation Projects
- Special Use Permit/Leased Areas

Jurisdictional Boundaries

- [Direct Protection Areas](#) (DPAs) – California

- Easements and Rights-of-Way (ROWS)
- Jurisdictional Boundaries
- Land Ownership by Agency ([BLM Surface Management Agency](#))
- Land Status (National Recreation Area, National Monument, National Park, etc.; [NPS Boundary and Tracts Feature Service](#) and [USGS Protected Areas Database](#))
- Private Inholdings (County GIS)

Museum Collections

- Buildings (housing museum collections and exhibits)
- Collections Storage Facilities
- Outdoor Museum Exhibits and Museum Exhibit Facilities

Paleontological Resources

- Paleontological Sites (sensitive)

Physical Features

- Flowlines and Waterbodies ([USGS 3D Hydrography Program](#))
- Landmarks and Placenames (peaks, populated places, valleys, etc.; [USGS Geographic Names Information System](#))
- Topographic Base Map
- Aerial Imagery Base Map

Scientific Research Areas

- Scientific/Remote Data Collection Equipment
 - Trail Counters
 - Seismic Monitors (sensitive)
 - Soundscapes Monitoring Equipment (sensitive)
 - Weather Stations ([RAWS](#), [Snowtel](#), etc.)
 - Wildlife Cameras and Webcams (sensitive)
- Study Areas

- Monitoring Plots (fire effects, etc.)

Specially Designated Lands

- Designated Wilderness and other [wilderness categories](#)
- [National Historic Landmarks](#) (NHLs)
- [National Natural Landmarks](#) (NNLs)
- [National Trail Systems](#) (NTS; national historic trails, national scenic trails, national recreation trails, etc.)
- Research Natural Areas (RNAs) – U.S. Forest Service
- [Scenic Byways](#)
- [UNESCO areas](#) (World Heritage, MAB, etc.)
- [Wild and Scenic Rivers](#) (WSR)

Vegetation

- Botany ([NPS Vegetation Mapping Inventories](#))
 - Alpine Vegetation
 - Broader scale species of concern (Whitebark Pine, Giant Sequoia, Joshua Trees, Limber Pine, etc.)
 - Culturally Significant Species
 - Fire Refugia
 - Known Site Locations for Special Status Species (sensitive)
 - Meadows
 - Old Growth Forests
 - Pathogen-resistant populations
 - Unique Botanical Areas
 - Vegetation Map Base Layer
- Champion or Plus Trees

- Invasive Plants
- Pathogen Presence (Sudden Oak Death, Port Orford Cedar Root Disease, Chytrid, etc.)
- Retardant Avoidance Areas
- Riparian Vegetation
 - Riparian Conservation Areas
 - Riparian Habitat Conservation Areas
 - Riparian Reserves

Terrestrial Wildlife

- Known Site Locations for Special Status Wildlife Species (sensitive)
 - Aerial Avoidance Areas
 - Nest/Den Sites (sensitive)
- Terrestrial Wildlife [Critical Habitat](#)

Wildland Fire Operations

- Dip and Draft Sites (tiered by level of approval)
- Fire History ([NIFC Historic Wildland Fires](#), [NPS Fire History](#))
- Firebreaks, Fuel Treatment Areas ([NPS Fuels and Post-Fire Treatments](#))
- Helispots, Helibases, and Mobile Retardant Bases
- Potential Operational Delineations ([USFS Risk Management Assistance POD Dataset](#))
- Previous Suppression Infrastructure
 - Firelines
 - Dozerline
 - Handline
 - Repeater Sites
 - Safety Zones

- Camps, ICPs, Spike Camps, Staging Areas, Parking Areas
 - Weed Wash Stations
- Retardant Avoidance Areas
 - Cultural Resources
 - Known Areas of Threatened, Endangered, Proposed, Candidate, and Sensitive Species
 - Water Features
- Watershed Boundaries (to inform water delivery restrictions; [USGS Watershed Boundary Dataset](#))

Appendix H. MMPK-to-Mobile Device Standard Operating Procedure

These procedures were current at the time of publication but are subject to change with app and software updates.

How to Load MMPK on an iOS Device

AirDrop

If the MMPK can be shared to a device from another iOS device through AirDrop, enable AirDrop; tap and hold the WiFi button or go to settings- Everyone for 10 Minutes.

Accept the shared MMPK and allow it to transfer.

Locate the MMPK in the Downloads folder. Tap and hold, select **Move**, select the **Field Maps** folder, then tap **Move**.

In Field Maps, the mobile map should be listed under On Device.

Download

If an invite to access the MMPK has been shared to the email account on a device, tap **Open** to the link in the email.

Tap the MMPK file's menu and select **Open in Another App**.

Tap **Save to Files** and select the **Field Maps** folder.

In Field Maps, the mobile map should be listed under On Device.

iTunes

The MMPK can be sideloaded to an iOS device with a USB connection to a computer that has iTunes installed.

If iTunes needs to be installed on a computer to facilitate this process, it can be downloaded from the NPS Software Center. Contact IT if issues are encountered.

Connect the iOS device to a computer with a USB cable. The phone or tablet must be turned on and the iOS device may be prompted to tap **Trust This Computer**.

In iTunes click the Mobile Icon (Figure H1).

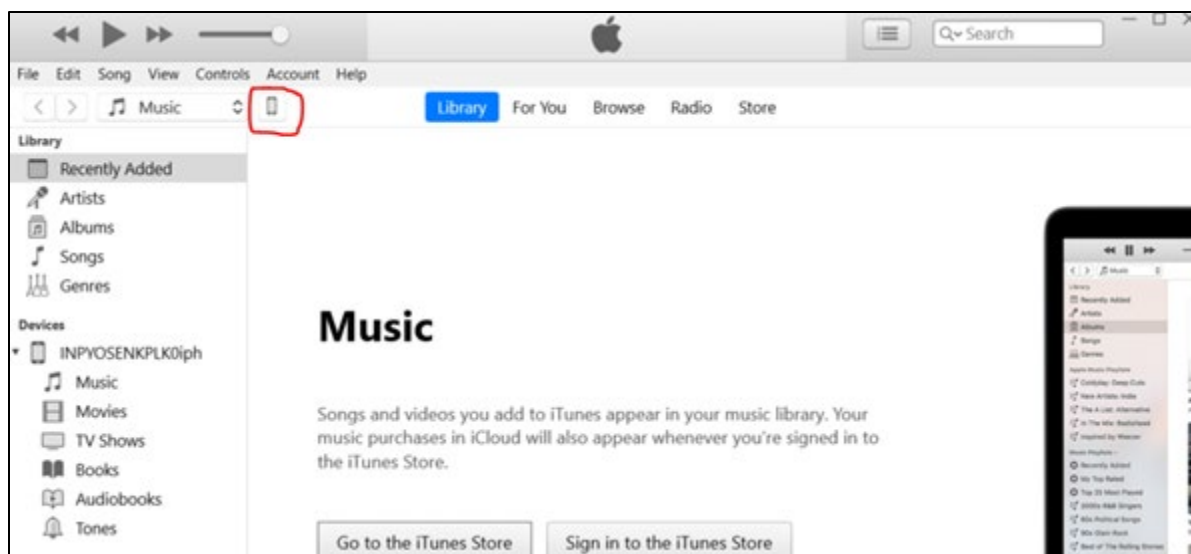


Figure H1. Click the mobile icon.

In iTunes, click **File Sharing**.

From the Apps list, select **Field Maps**.

Open File Explorer in a separate window next to iTunes. Drag the READ MMPK file from File Explorer to Field Maps Documents in iTunes (Figure H2).

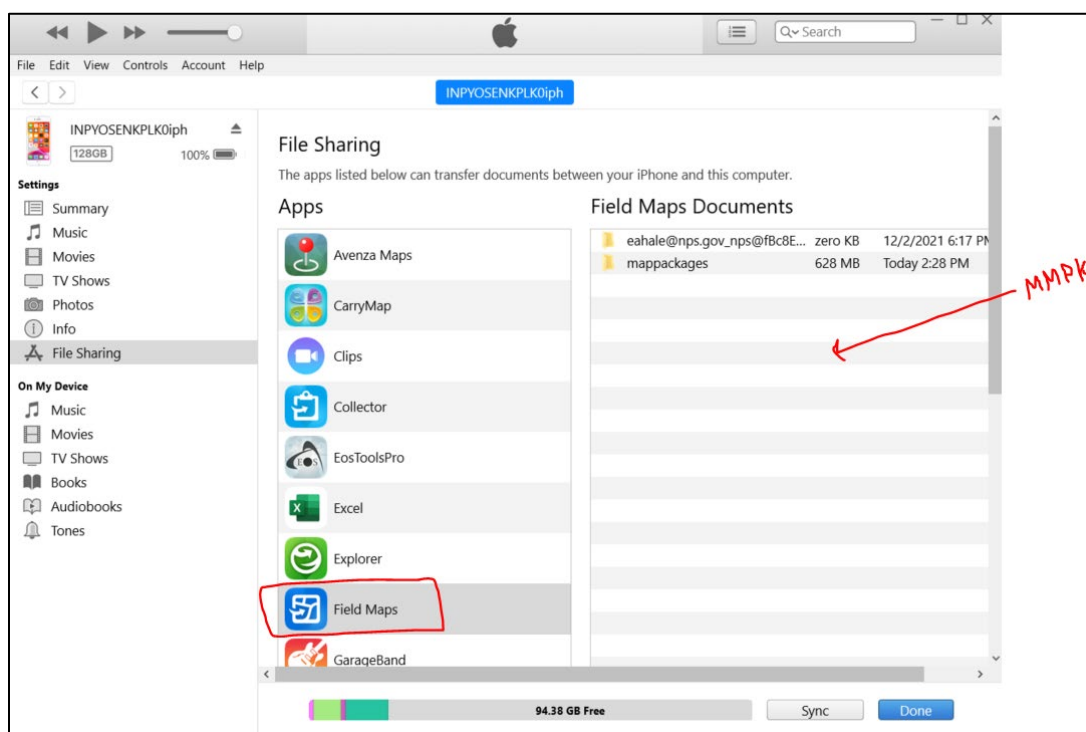


Figure H2. Select Field Maps from the app list and drag the MMPK file into iTunes.

In Field Maps, the mobile map should be listed under On Device.

How to Load MMPK on an Android Device

Connect the Android device to a computer with a USB cable. The device must be turned on and it may be necessary to sign in to enable the full connection to the folders on the device.

Copy-paste the MMPK file from the computer to the following folder on the device:

`\Android\data\com.esri.fieldmaps\files\mappackages`

In Field Maps, the mobile map should be listed under On Device.

Appendix I: List of Acronyms

AAR: After Action Review

AGOL: ArcGIS Online

AH: All-Hazard

AIS: Aquatic Invasive Species

ARCH: Fireline Archeologist

ATF: Bureau of Alcohol, Tobacco, and Firearms

BAER: Burned Area Emergency Response

CFR: Code of Federal Regulations

CR: Cultural Resource

CRIS: Cultural Resources Inventory System

CUI: Controlled Unclassified Information

DOI: Department of the Interior

DPA: Direct Protection Area

EA: Environmental Assessment (NEPA)

EIS: Environmental Impact Statement (NEPA)

EPA: Environmental Protection Agency

ESA: Endangered Species Act

FAM: NPS Fire and Aviation Management Division

FBI: Federal Bureau of Investigation

FEMA: Federal Emergency Management Agency

FMP: Fire Management Plan

FMU: Fire Management Unit

FONSI: Finding of No Significant Impact (NEPA)

FWS: US Fish & Wildlife Service

GIS: Geographic Information System

HFC: Harper Ferry Center

HVRA: Highly Values Resources and Assessments

IAP: Incident Action Plan

ICP: Incident Command Post

IRG: Incident READ Guide

ISAP: Incident Strategic Alignment Process

IMR: NPS Intermountain Region

LNT: Leave No Trace

LURG: Local Unit READ Guide

MIST: Minimum Impact Strategies and Tactics

MR: Management Requirement (WFDSS)

MRA: Minimum Requirements Analysis

NAGPRA: Native American Graves Protection and Repatriation Act

NEPA: National Environmental Policy Act

NHL: National Historic Landmark

NHPA: National Historic Protection Act

NHT: National Historic Trail

NIFC: National Interagency Fire Center

NNL: National Natural Landmark

NMFS: National Marine Fisheries Service

NPS: National Park Service

NR: Natural Resource

NRA: National Recreation Area

NTS: National Trail Systems

NWCG: National Wildfire Coordinating Group

PAC: Potential Activity Center

PII: Personally Identifiable Information

POC: Point of Contact

PWR: NPS Pacific West Region

REAC: Lead Resource Advisor

READ: Resource Advisor

REAF: Fireline Resource Advisor

RELL: Resource Advisor Learning Library ([Wildland Fire Learning Portal](#))

RNA: Research Natural Area

ROD: Record of Decision (NEPA)

RPM: Resource Protection Measure

SHPO: State Historic Preservation Officer

SOP: Standard Operating Procedures

SO: Strategic Objective (WFDSS)

SFPU: Spatial Fire Planning Unit

TES: threatened, endangered, and sensitive species

THPO: Tribal Historic Preservation Officer

UAS: Unmanned Aviation System (drone)

UTV: Utility Task Vehicle

UXO: Unexploded Ordinance

WF: Wildland Fire

WFDSS: Wildland Fire Decision Support System