National Park Service
Department of the Interior

Natural Resource Stewardship and Science

Inventory and Monitoring Division Communication Strategy and Resource Guide

Natural Resource Report NPS/IMD/NRR—2016/1208

ON THE COVER
Bill Route, program manager for the Great Lakes Network, explains contaminants monitoring in eagles for an "audio postcard" that aired on National Public Radio-affiliate WBEZ (Chicago).

Inventory and Monitoring Division Communication Strategy and Resource Guide

Natural Resource Report NPS/IMD/NRR—2016/1208

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The National Park Service, Natural Resource Stewardship and Science office in Fort Collins, Colorado, publishes a range of reports that address natural resource topics. These reports are of interest and applicability to a broad audience in the National Park Service and others in natural resource management, including scientists, conservation and environmental constituencies, and the public.

The Natural Resource Report Series is used to disseminate comprehensive information and analysis about natural resources and related topics concerning lands managed by the National Park Service. The series supports the advancement of science, informed decision-making, and the achievement of the National Park Service mission. The series also provides a forum for presenting more lengthy results that may not be accepted by publications with page limitations.

All manuscripts in the series receive the appropriate level of peer review to ensure that the information is scientifically credible, technically accurate, appropriately written for the intended audience, and designed and published in a professional manner.

This report received informal peer review by subject-matter experts who were not directly involved in the collection, analysis, or reporting of the data.

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Executive Summary

Background

The Inventory and Monitoring Division (IMD) Communication Strategy and Resource Guide has been developed to provide all IMD staff with information, strategies, and practical tools to better communicate the work we do. This document melds the strategic with the practical: overall objectives reflect division-wide direction and goals, and specific tools and resources provide a tangible road map towards meeting these goals.

The IMD has been actively collecting and reporting on inventory and monitoring data for over 15 years. During this time there have been some areas of structured communication standards and guidance (e.g., the Natural Resource Publication Series, network Internet sites). However, in many other areas, products, presentations, and messages have varied widely. This was to be expected of 32 network offices dispersed across the country, and of a program in its early years of establishment. Communication is a skill increasingly required of 21st-century scientists and scientific programs, and as the IMD moves into a phase of sustained operations, the need for coordinated and effective communications is fundamental.

This strategy is part of a tiered structure of communication documents. The Natural Resource Stewardship and Science (NRSS) Communication Framework sets forth a vision and principles for conducting science communication within the NPS. This IMD strategy takes the vision and principles from the NRSS framework the next step—to the I&M division level. From there, the strategy provides IMD networks with resources to develop local implementation plans, which allow networks to meet both their specific needs and support the larger division goals.

The strategy is organized by four main objectives, each based on a target audience group:

- Objective A targets NPS decision makers: "*IMD science seamlessly integrates into NPS resource management decisions*."
- Objective B targets the scientific community: "*IMD effectively interfaces with the scientific community*"
- Objective C targets internal IMD, NRSS, and NPS leadership communication: "*IMD staff, NRSS staff, and NPS leadership are well-informed and coordinate activities and goals*"
- Objective D targets the public: "*Public audiences understand, value, and are inspired by the work the IMD does as part of the NPS*"

Within each objective are specific key messages, strategies, tactics, and expected outcomes. Tools and evaluation options for each tactic are provided in appendices A–D. Tactics and tools are dynamic and evolving, and they will be updated and adjusted periodically to maintain their relevance and reflect lessons learned from implementing the strategy.

Strong and effective communication is inherently part of everyone's job in the IMD. By providing a road map, useful tactics and tools, and a means of sharing our communication endeavors, this strategy and resource guide sets a course for ensuring IMD information completes its "last mile" and reaches the broadest audiences possible in the most useful formats.

Implementing the Strategy

Strategies and plans are only blueprints and the challenge always lies in moving them from concept to action. Combining, in this document, both high-level goals and objectives with practical tools and tactics, provides a means to bridge the gap between concept and action.

Individual parks, networks, and even divisions are sometimes referred to as "islands" or "silos." Geographic distance plays a part in this, as well as the NPS tendency to manage parks, offices, and programs as autonomous units. Moving away from the silo frame of mind and towards a model of greater cooperation and partnerships is essential to the successful implementation of this plan. Sharing projects, positions, expertise, and

lessons learned will extend our resources, our message, and our effectiveness.

Some of the tactics are flagged as "IMD Priority," which indicates that they have been identified as having a high return for the effort. Some tactics may have a check mark indicating "immediate benefits," which highlights actions that can be taken in the short-term and that can result in tangible and beneficial outcomes. Items marked with the letter C indicate IMD-wide actions that will be coordinated by the IMD Central Office. Whenever possible, items that are included as "tools" in this document are associated with specifics: guides, websites, training courses, or resources that provide a direct path to action.

Accompanying this plan is the IMD Communication website that provides resources in an interactive format, and that is designed to be updated and refreshed as new information becomes available. The website also hosts forums for discussion and feedback among staff, allows uploading and sharing examples of work, and sets the stage for continuous improvement.

The five primary goals of the Inventory and Monitoring Division

1. **Inventory the natural resources under National Park Service stewardship to determine their nature and status.**

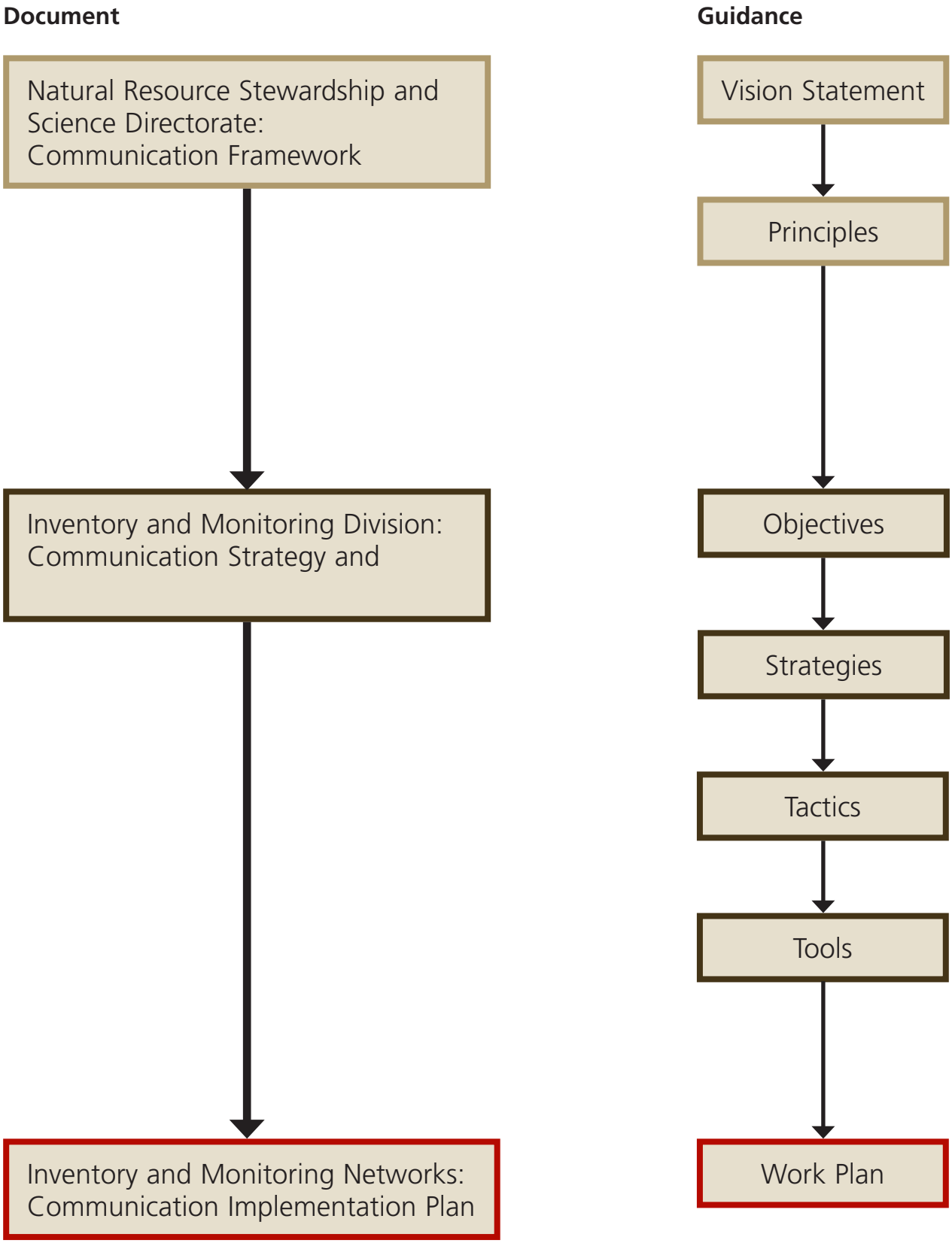
2. **Monitor park ecosystems to better understand their dynamic nature and condition and to provide reference points for comparisons with other, altered environments.**

3. **Establish natural resource inventory and monitoring as a standard practice throughout the National Park system that transcends traditional program, activity, and funding boundaries.**

4. **Integrate natural resource inventory and monitoring information into National Park Service planning, management, and decision making.**

5. **Share National Park Service accomplishments and information with other natural resource organizations and form partnerships for attaining common goals and objectives.**

NRSS and IMD Communication Planning Hierarchy



Introduction

The Inventory and Monitoring Division (IMD) Communication Strategy and Resource Guide provides information, strategies, and practical tools the division can use to improve communications. The strategy is organized around the four key audiences of IMD information:

- Park resource management decision makers
- The broad scientific community
- Ourselves—IMD, the Natural Resource Stewardship and Science Directorate (NRSS), and other National Park Service (NPS) staff and offices.
- The public, and interpretation and education staff

This strategy is part of a tiered structure of communication planning documents. The overarching planning document is the Natural Resource Stewardship and Science (NRSS) Communication Framework (pending signatures). The Framework sets forth the directorate's vision and principles for conducting science communication within NRSS. This IMD strategy takes those elements the next step—to the I&M division level. From there, IMD networks have the opportunity to develop implementation plans that leverage the IMD strategy to meet the specific and local needs of networks (see Appendix F for example network implementation plan).

Communication leads to community; that is, to understanding, intimacy and mutual valuing. —Rollo May

Over the past decade, the IMD focused primarily on creating a solid science foundation for our program by conducting inventories, implementing monitoring protocols, and developing data management systems. Now we have completed many of those tasks and have significant information to communicate. Placing more emphasis on communication is a natural evolution of our program.

Individual parks, networks, and even divisions are sometimes referred to as "islands" or "silos." Geographic distance plays a part in this, as well as the NPS tendency to manage parks, offices, and programs as autonomous units. Moving away from the silo frame of mind and towards a model of greater cooperation and partnerships is essential to the success of this plan. Sharing projects, positions, expertise, and lessons learned will extend our resources, our message, and our effectiveness.

Methods

This strategy was developed through extensive information gathering, collaboration with workgroups, and synthesis. Employee surveys, conversations, interviews, workgroup products, and communication research also formed the basis of this plan. Information sources included:

- NPS and network communication plans
- NPS planning and strategy documents
- Employee survey results, including the 2013 IMD staff survey
- Communications research
- Leadership and teamwork research
- Performance measures
- Position descriptions
- Training offerings
- Budgets

In 2014, the IMD established several workgroups whose efforts are largely incorporated into this plan. Communication-related

"By communicating the results and practices of science, the NPS can make informed stewardship decisions, and inspire the public's commitment to preserve our nation's heritage through place-based, free-choice science learning."

1. Science communication accurately presents current scientific knowledge for informed decision-making.
2. Science communication recognizes and is respectful of public audiences' diverse values, social contexts, beliefs, and worldviews.
3. Science communication provides opportunities for diverse audiences to develop personally relevant intellectual and emotional connections with parks and the resources they protect.
4. Science communication fosters learning about the results and processes of scientific research and thereby promotes a greater understanding of the value of science in decision-making.
5. Science communication strives for the highest level of professionalism through the use of best communication practices.

information and recommendations were derived from the following workgroups:

- Science Communications Technical Advisory Group
- Integrating Science into Management Workgroup
- Stellar Science Workgroup
- Publications Workgroup

An Internal Communications Workgroup formed in mid-2015, but had not yet developed recommendations that could be included in this plan.

(See Appendix H for workgroup information.)

Individual and group interviews of NPS staff provided insight into broader perspectives on IMD and NPS communications (see Appendix I for a list of contributors). Among those interviewed were:

- IMD central office, regional, and network staff
- Park-based resource management staff, interpreters, division chiefs, and superintendents
- Harpers Ferry Center staff
- Distance Learning Center staff
- Operational Leadership staff
- Centennial planning staff
- Research Learning Center staff
- NRSS staff, including Outreach Technical Advisory Group (OTAG) members

How to use this strategy

This strategy is organized by four main objectives, each based upon a target audience group:

- Objective A targets NPS decision makers
- Objective B targets the scientific community
- Objective C targets internal IMD, NRSS, and NPS leadership communication
- Objective D targets the public

Contained within each objective are:
Key Messages: the primary concepts and ideas that we strive for, and that we want to convey to audiences.
Strategies: the overall approaches we will take to achieve an objective.
Tactics: specific communication activities that provide actions for the IMD networks and Central Office.
Expected Outcomes: our expectations for

the end results and benefits of meeting an objective.
Tools: a range of options, resources, and ideas for implementing tactics. Suggestions for evaluating and modifying tactic effectiveness are also provided.

Additional resources are contained in appendices and a corresponding website that include tools and evaluations for every tactic, staffing analysis, best practices, examples, templates, training resources, performance measures, position descriptions, and more.

Throughout this document the term "networks" refers to field-based network offices; "Central Office" refers to the directorate office and staff based in Fort Collins; and "IMD" is a broad term, encompassing the directorate and all staff. Most of the ideas and tools presented in this strategy apply across the division and can be used by all staff and offices. Those items that are more appropriately coordinated at the division level are flagged as being led by the Central Office.

Network implementation of this strategy

This strategy is intended to provide basic material for network communication implementation plans. This will help ensure a more cohesive and integrated approach to communication across the IMD.

Developing a network implementation plan should be a streamlined process. The IMD Communication Strategy is not prescriptive; rather, it provides the background, context, planning, and ideas that networks can use to develop their own plans. An example network plan is provided in Appendix F. Networks can select, adopt, and apply tactics and tools from this plan that fit their particular needs and circumstances. Network communication implementation plans are intended to be short, straightforward, and actionable.

Although the objectives and supporting information presented here set a path for the upcoming years, the actionable tactics and tools are dynamic and evolving. They will be updated and adjusted periodically to maintain their relevance, and to incorporate lessons learned and new ideas developed by networks and staff.

Partnerships and collaboration

Partnerships and collaboration are essential tools that can extend limited resources and benefit all who are involved. Enlisting the help of others and finding common solutions often produce far better end results than when working independently. Communication partnership resources for IMD to consider include:

Research Learning Centers (RLCs)
RLCs bring research and education together in parks. RLCs assist researchers, educate audiences about science, and help park interpreters incorporate science into their programs. Each RLC is distinct, and while not every IMD network is affiliated with an RLC, they can be an ongoing partner for increasing a network's communication effectiveness and reach to diverse audiences. (RLC website)

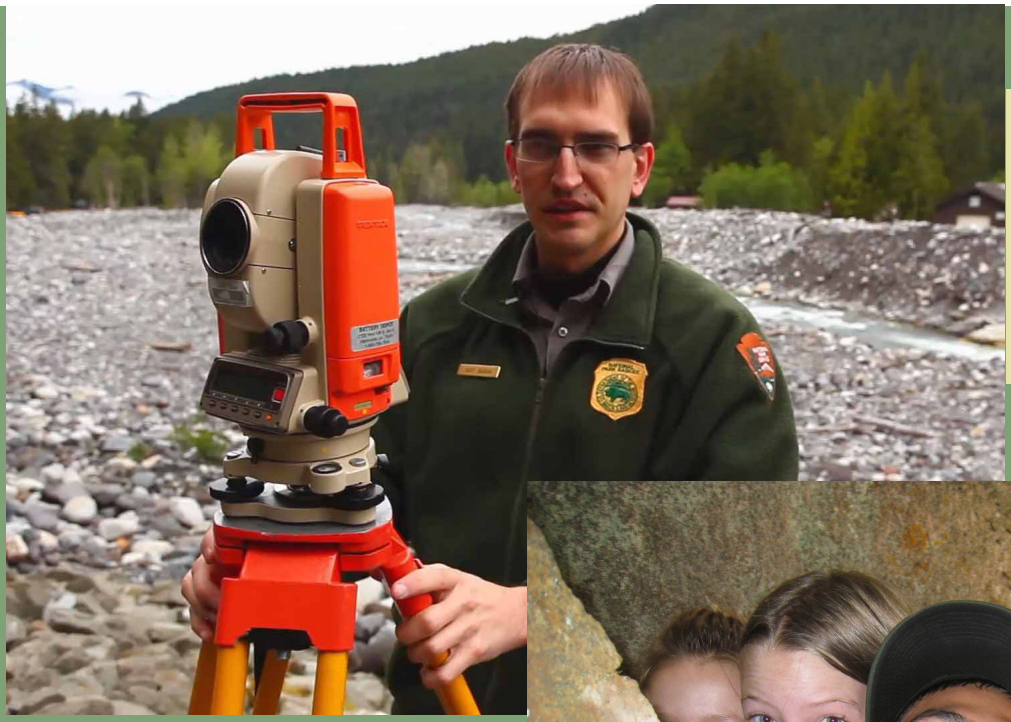
The Crown of the Continent Research Learning Center coordinates a citizen science program. Here, citizen scientists scan a talus slope for pika haypiles and scat.

Cooperative Ecosystem Studies Units (CESUs)
CESUs facilitate collaborative and interdisciplinary projects that address natural and cultural resource issues. The 17 CESUs, each of which is focused on a particular biogeographic region of the country, bring together scientists, resource managers, students, and other conservation professionals, both federal and nonfederal. (CESU website)

Volunteers
National Park Service units attract a dedicated corps of volunteers, many of whom bring specialized science, teaching, management, and communication skills to their parks. Most parks have volunteer coordinators who match the talents and interests of volunteers with available schedules, tasks, and needs. Discussing network requirements with these coordinators may result in bringing helpful assistance to specific network projects.

Non-profits
As with NPS volunteers, many non-profit organizations have exceptional talent among their members. Outreach to local groups or chapters may also result in work that is rewarding to both the volunteer and the network or park.

Schools and Universities
Many schools have specific programs in science education, human dimensions, advertising and marketing, journalism, multimedia, and communication. Establishing partnerships with these institutions can give students the opportunity for invaluable work experience, with mutual benefits to IMD and parks.



Objectives A, B, and C target peers and colleagues within and outside the National Park Service.

Objective D focuses on the public. This audience includes park interpretation and education staff, who work directly with the public.

A

Objective A: IMD science seamlessly integrates into NPS resource management decisions

The communication of scientific information to parks is one of the IMD's five primary goals. From the division's inception there has been the clear expectation that park planners, managers, and decision makers will receive, apply, and benefit from IMD data.

The results of IMD monitoring and research have been presented in thousands of technical reports and briefs over the course of the last ten years. While this is an impressive accomplishment, we need to better evaluate which forms of communication are most effective and useful to park managers. This will make the IMD both efficient and sustainable in conveying science information.

Strategies and Associated Tactics
(see Appendix A for tools to execute each tactic)

Strategy A1: Develop collaborative, two-way communication with park staff and decision makers.

- Tactic 1: Engage parks in the best alignment of IMD science, park information needs, and decision support

Strategy A2: Deliver timely and focused information to decision makers.

- Tactic 2: Make IMD databases and scientific information easy to find and access

Strategy A3: Investigate the needs and preferences of park managers and use multiple media and delivery formats.

- Tactic 3: Use InsideNPS to increase the IMD's visibility in NPS
- Tactic 4: Share IMD information with park decision makers in a variety of formats and venues

Strategy A4: Balance detailed information with "big picture" implications when communicating with decision makers.

- Tactic 5: Facilitate training in the fundamentals of science-based decision-making
- Tactic 6: Ensure that an IMD-focused component is included in new employee and related NPS training

Expected Outcomes

Meeting Objective A will increase the role of sound science in park resource management decisions. IMD and park management staff will mutually understand each other's goals, responsibilities, and processes. Land management stakeholders and interested parties will know how to find and apply IMD science information.

Integrating Science and Management Workgroup

The IMD Integrating Science and Management Workgroup is made up of park resource specialists, decision makers, and IMD network scientists. The purpose of the workgroup is to identify what encourages a better connection between science produced by IMD and park management decision making. Objective A incorporates much of this group's work outlined in their 2016 report (Bennetts et al. 2016).

Develop Effective Two-way Communication

One approach to increase effective communication is to move away from the current provider-client (IMD-parks) model to one of collaboration based on two-way communication. While networks are good at delivering information, their effectiveness can be improved by listening to what parks need for information. While presentations are valuable, the face-to-face opportuni-

IMD Priority

Immediate Benefits

Central Office Coordination

Your Audience?
NPS land management decision makers, such as natural resource specialists, superintendents, and division chiefs

ties they present are more valuable to move toward stronger relationships and match IMD information to delivery needs.

Listening sessions should be incorporated into regular park visits and meetings to hear about park resource management challenges and explore common areas where the IMD can provide support, either through their ongoing monitoring or through technical assistance. In order for the IMD to be effective in science delivery, a true collaboration must be established with the parks.

An essential part of the process is for park decision makers to provide feedback on the content of IMD products, how they will be used, and to suggest adjustments to increase their utility. Through such a process, decision makers will increase their understanding of IMD data and our mission, and scientists will broaden their understanding of how resource specialists and decision makers use the data. By cultivating understanding, IMD scientists will be better able to provide more consistently useful products to park decision makers.

Deliver Timely and Focused Information

Networks need to work with park managers to understand what information is considered imperative for park decision making, then determine which communication methods work best to deliver the information in a timely way. Discussing park information needs and establishing preferred communications ahead of time will help to avoid missing an opportunity to provide information for a critical management decision. In addition, communicating prior to funding calls (e.g., Servicewide Comprehensive Call) may better align funding proposals with resource management needs.

Identify "Big Picture" Implications

The selection of network vital signs and development of monitoring protocols were largely based on a critical analysis of ecological conceptual models developed in conjunction with park staff. These vital signs were selected based on a consensus of their importance as indicators of the health or condition of park natural resources, or their effects as stressors. While networks understand the implications of the results, it is important that they place results in the greater context of resource management. Again, engaging network parks in evaluating monitoring results is essential if the IMD is to effectively and consistently deliver findings in a form that is useful to decision makers.

Use Multiple Media and Delivery Formats

Lengthy technical reports do not meet all the needs of all audiences. The majority of networks also produce resource briefs—concise highlights of monitoring findings in a visually appealing format that are directed towards a wider range of NPS staff. Both of these approaches, however, represent static documents that may or may not fulfill the needs of park decision makers. The IMD is currently developing web-based data visualization tools that are a promising new path. Some visualizations may be suitable for park resource specialists, decision makers, and other audiences to access and explore data and generate information relevant to their own park needs. In addition, IMD participation in park-based resource management meetings provides an alternate delivery mechanism, reaching decision makers with timely information.

Key Messages For Objective A

The IMD seeks to understand the needs and circumstances of parks and decision makers.

IMD staff are essential park partners, with a vested interest in successful, sustainable park management.

IMD strives for data that are high-quality, defensible, relevant, and applicable to park managers.

IMD monitoring helps park staff make decisions for today and tomorrow.

The IMD needs and values the on-the-ground knowledge park staff have about their park and resources.

B

Objective B: IMD effectively interfaces with the scientific community

IMD data are the foundation upon which the program is built. IMD strives to ensure that its investigations are well-designed and are conducted by highly-trained and qualified scientists, managers, technicians, and support staff.

It is important for IMD science to contribute to the greater understanding of natural resources and achieve recognition through the dissemination of information in a wide range of publications, scholarly products, and venues. These include but are not limited to: peer-reviewed journal articles and books, symposia and conferences, technical reports, gray literature, and web-based interactive tools. Other products and outlets that advance the scientific understanding of NPS natural resources and convey IMD's work include presentations, the popular press, newspaper articles, interviews, photographs, and videos.

Objective B provides a framework for raising the science profile of the IMD and for communicating our mission, methods, and results. All IMD staff, regardless of job description or training, have the opportunity to be science ambassadors for the division and for the NPS.

Strategies and Associated Tactics
(see Appendix B for tools to execute each tactic)

Strategy B1: Develop, publish, disseminate, and meet standards for peer review, quality control, certification, and reporting of IMD data.

- Tactic 1: Establish and communicate accountability expectations for quality, scientific integrity, peer review, and authorship of scientific products
- Tactic 2: Streamline the formatting and production of final reports

Strategy B2: Encourage publication in peer-reviewed science journals as a means to maintain science credentials and allow other scientists to readily access IMD work. Publication can also support management decisions that may benefit from the firm foundation offered by these publications.

- Tactic 3: Regularly publish scientific findings for each monitoring program
- Tactic 4: Facilitate efforts for collaborative scientific publishing

Strategy B3: Provide opportunities for IMD staff to participate in professional meetings and conferences.

- Tactic 5: Encourage and support IMD representation and participation at scientific meetings, conferences, and collegial gatherings

Strategy B4: Invest in employees to develop professional communication skills.

- Tactic 6: Improve staff skills in preparing and delivering technical presentations
- Tactic 7: Improve staff skills in technical writing and editing

Strategy B5: Develop data delivery channels, formats, and tools so that IMD data are easily discoverable by a variety of end users.

- Tactic 8: Provide web-based access to IMD data sets, and tools to improve their visualization, interpretation, and analysis

IMD Priority

Immediate Benefits

Central Office Coordination

- Tactic 9: Improve access to scientific literature

Expected Outcomes

Objective B supports high-quality science in the IMD and active participation in the scientific community. Collaboration with peers and sharing IMD research and results is essential to increasing the division's credibility and visibility. Meeting Objective B will help ensure that IMD data reach the full range of end users, that the provenance and integrity of our data are documented, and that our work becomes an essential piece of the larger body of scientific research and knowledge.

Communities of Practice and Workgroups

The IMD maintains an "Excellence in Science" committee. Within this committee, the "Stellar Science" workgroup provides IMD leadership with recommendations on structure and definition as to what excellent science and scientists should be within the IMD. Objective B incorporates much of this group's work as outlined in their 2016 report (Perkins et al. 2016).

IMD Publications

Analysis and reporting are central to the IMD. They are the long-term record of our work and help establish the division's scientific merit and credibility. Over the past decade, a range of products, reports, and formats has been developed by both the Central Office and individual networks. In order to establish standards and consistency within the division, initial steps have been taken to identify a core suite of products and formats that would meet most network needs for regular publications.

These products currently range from one- to two-page briefs that focus on a specific topic or set of results, to reports published in the NPS Natural Resource Publication Series.

IMD peer review guidance, finalized in 2015 (NPS 2015), prescribes the roles, functions, and process for both the review and release of scientific documents developed by the IMD. Publications such as Natural Resource Reports should be accompanied by metadata (e.g., the Manuscript Submittal Form) that documents the peer review process, including the level of peer review the publication received.

In addition, IMD staff develop integrated science information products that are often the result of partnerships with park staff, partner organizations, and others. The IMD has established guidance on authorship (Gallo 2015) that sets standards and recommended practices for IMD staff and ensures transparent and appropriate attribution and accountability for publications.

Key Messages For Objective B

The IMD conducts high-quality research that contributes to the efforts of the broad scientific community.

The IMD supports its scientists and staff in their professional development.

IMD cultivates an environment of collegiality and community as a means to increase partnerships and provide access to a range of skills.

IMD data are reviewed, documented, and available in formats most useful to the scientific community.

The professional experience, judgment, and opinions of IMD scientists are important resources for the IMD and the NPS.

The IMD welcomes collaboration with researchers to build on baseline monitoring and answer research questions.

C

Objective C: IMD staff, NRSS staff, and NPS leadership are well-informed and coordinate activities and goals

The distributed nature of the IMD (32 networks, 6 regional offices, and 1 central office) has historically led networks to develop local solutions to local problems. While there is value in this tradition of independent autonomy, it has also led to communication and teamwork challenges. Problems or bottlenecks can be difficult to identify, even if many networks are experiencing them. Successes and innovative solutions can be equally difficult to share and disseminate across the division. By improving the collective communication with the Central Office and among networks, the IMD will be able to more quickly identify problems, share successes, allocate staff resources appropriately, and spread innovation rapidly.

Regular communication across NRSS divisions and with NPS leadership is also essential. In addition to others in NPS benefiting from the IMD's expertise and results, we need to be aware of and capitalize on opportunities for partnership and contributions at levels beyond the IMD.

Meeting Objective C will help solidify the role of the IMD within NRSS and the NPS. It will also strengthen communication among the 32 networks and between the networks and the Central Office, and will create pathways for information sharing, partnerships, and teamwork. This will help us maintain a unified vision for the IMD, use limited resources more efficiently, and ensure that all staff have a voice and a role in the future of the IMD.

Strategies and Associated Tactics
(see Appendix C for tools to execute each tactic)

Strategy C1: Support an environment of continuous learning where experience, success, and lessons learned are openly shared and discussed.

- Tactic 1: Use webinars to regularly share the progress and results of staff work
- Tactic 2: Improve communication and collaboration with other NRSS divisions, directorates, and NPS leadership

Strategy C2: Create and support opportunities for networks to collaborate among themselves. Recognize and share successes that result from partnerships.

- Tactic 3: Facilitate opportunities for network and Central Office staff to work temporarily in other offices
- Tactic 4: Encourage and support multi-network collaborations and project work

Strategy C3: Establish a process and channels for networks to submit suggestions and requests to IMD leadership or Central Office staff, and assign staff to evaluate them and respond.

- Tactic 5: Develop an annual process for assessing network needs

Strategy C4: Regularly communicate news, information, guidance, and strategic decisions from the Central Office to networks, and to other NRSS divisions and directorates as appropriate.

- Tactic 6: Improve communication of IMD strategic plans and directions to

IMD Priority

Immediate Benefits

Central Office Coordination

Tips for Internal Communication

Consider taking steps to improve your communication skills. Learn concepts and best practices, then focus on building one communication skill at a time. Set aside time to communicate and build working relationships with others. As a general approach, be positive, appreciate others, and listen actively (seek first to understand, and then to be understood).

Smart leaders take time to build teams, and teams that tell each other the truth always "win" (Eurich 2015). It is possible to create a self-aware team where staff can express opinions and share successes and failures, all in a non-judgmental environment.

Remember to communicate to individuals, not stereotypes. Avoid biases about generations. Face to face communications are best, when possible, especially when consensus is needed. Encourage honest feedback and listen more than you talk. Contact staff even when you don't need something from them. When possible, make communications personal. Be generous with saying "thank you."

Provide opportunities to listen to staff concerns, show that you have listened, and then respond. As a general rule, a "teaching" approach is more effective than mandates (Hathi 2015).

networks, provide network representation during development, and multiple feedback and review opportunities

- Tactic 7: Distribute news, notes, and updates regularly
- Tactic 8: Provide organizational charts and update contacts regularly

Strategy C5: Develop and maintain tools that support and improve internal communication.

- Tactic 9: Develop and adhere to best practices for organizing, conducting, and participating in meetings
- Tactic 10: Develop tools for staff to find, submit, and share information
- Tactic 11: Develop standardized IDP and EPAP critical elements regarding communications and teamwork
- Tactic 12: Recognize and reward IMD staff for innovative internal communications

Expected Outcomes

Meeting Objective C will help unify IMD staff and networks that are widely dispersed across the country. All staff will understand the IMD's direction and priorities and will know how to have their voices heard within the division. Networks see themselves less as islands and more as essential partners with other networks and the Central Office. Other divisions and NPS directorates will understand the goals and value of the IMD.

Communities of Practice and Workgroups

In 2015, the IMD created an "Internal Communications Workgroup." This workgroup has begun to define its goals, objectives, and key issues, which will feed into this section of the Communication Strategy. Other workgroups and committees, including those focusing on "Excellence in Science," also provide perspectives for improving internal communications.

Key Messages For Objective C

IMD success depends on all staff sharing ideas and lessons learned—both successes and failures.

The IMD is stronger through network partnership than through network silos.

Communication requires ongoing commitment, investment, and personal effort.

IMD Communication occurs at all levels: personal, team, network, regional, and national.

D

Objective D: Public audiences understand, value, and are inspired by the work the IMD does as part of the NPS

The primary responsibility of the IMD is to conduct scientifically valid inventories of biological and physical natural resources, and long-term monitoring of key ecological indicators, with the goal of providing park managers information they need for decision making.

However, a far broader audience can also benefit from our work. Parks are places of learning, and the IMD, as a scientific arm of the NPS, has an opportunity to help make parks places of science learning, conveying to the public the complexities, vulnerabilities, and significance of our natural heritage.

Communication is a skill increasingly required of 21st-century scientists and scientific programs. For the IMD, communications with the public have been focused primarily on print- or web-based text and documents, some direct public engagement, and social media efforts. Elevating communications beyond the passive "data or reports available" and actively engaging public audiences in multiple ways will enable the IMD to meet Objective D.

Strategies and Associated Tactics (see Appendix D for tools to execute each tactic)

Strategy D1: Communicate both why and how the IMD conducts its work.

- Tactic 1: Create employee/career profiles to share stories about how IMD staff got into their line of work
- Tactic 2: Promote network activities and research in popular press articles
- Tactic 3: Provide training and support in public affairs and addressing the media

Strategy D2: Leverage the experience, skills, and knowledge of park interpretation and education staff to connect with public audiences.

- Tactic 4: Provide citizen science program support
- Tactic 5: Present talks for in-person or virtual audiences
- Tactic 6: Host booths at relevant events
- Tactic 7: Ensure the IMD participates in larger NRSS and Office of Education and Outreach (OEO) communication efforts and strategies
- Tactic 8: Develop and maintain relationships with park-based interpretation, education, and other staff
- Tactic 9: Create toolkit for park interpreters about the IMD (based on Natural Sounds workbook)

Strategy D3: Communicate research results and their present and future value.

- Tactic 10: Produce resource brief and newsletter publications
- Tactic 11: Develop and promote park-based species checklists
- Tactic 12: Develop science communication skills

Strategy D4: Apply NPS Graphic Identity standards to all communication products; ensure staff in photographs and video meet NPS standards for dress and safety. Meet

IMD Priority

Immediate Benefits

Central Office Coordination

Tips for Communicating with Interpreters, Educators, and the Public

The "So What?" Test
Convey the main point of the communication in 30–90 seconds. Pass the "so what?" test as soon as possible. Why should the audience care? Look for hidden relationships or an angle of interest. Help the audience invest in and connect to the content. Think about the audience's benefit, not your own sense of what you think they ought to learn. Spark this audience's inherent curiosity.

Design and Media Use
Strategy D4 should be met for all communications. Control the experience of the audience. Where do they look first? In what direction does the content flow? Apply basic design principles to all communications. This includes: hierarchy, proximity, repetition, balance, contrast, alignment, and space. Provide well-designed content and use eye-catching photographs and visuals (see Appendix E).

Photographs and visual representations of information are essential. Consider conceptual models or simple charts (infographics) to showcase ecosystems, dynamic processes, trends, and statistics.

Digital and interactive media are necessary to reach and engage this audience. Consider whether video or an interactive map can better communicate the information. Why spend hundreds of words if you can quickly demonstrate, illustrate, or allow users to participate? Just as important as matching the messages to the target audience, be sure to choose an appropriate communication method (e.g., email, publication, and video). Seek input and reviews from others to ensure success.

accessibility regulations and best practices to reach the widest audience possible.

- Tactic 13: Provide publications training

Strategy D5: Employ new media technologies to engage audiences.

- Tactic 14: Provide coordinated website services and management within the IMD
- Tactic 15: Provide social media coordination and promotion
- Tactic 16: Provide videography training and services
- Tactic 17: Increase audience engagement with interactive media and displays

Expected Outcomes

The process of meeting Objective D will allow IMD staff to understand the need, benefits, and rewards of regularly communicating with park educators, interpreters, and the public. Tools, techniques, and resources will be readily available to IMD staff. Park staff will have more opportunities to include science content in their services, sparking interest in and greater understanding of science among visitors. As a division, the IMD will make significant contributions to making NPS a recognized leader in science communication.

Key Messages For Objective D

The IMD conducts high-quality, long-term scientific monitoring of park natural resources.

Results of IMD monitoring help park staff make sound resource decisions–ensuring parks are managed and protected for the enjoyment of future generations.

IMD science is place-based and long-term.

Changes in park resources detected by IMD monitoring can reveal trends that affect our everyday lives outside of parks, across the continent, and globally.

IMD science is relevant to park visitors and can spark a lifelong interest in science.

Park visitors can get involved and help collect sound science data.

Science communication is an essential part of the IMD's work and helps fulfill the greater NPS mission.

Literature Cited

Bennetts, R.E., N. Chambers, J. Comiskey, K. James, J. Lawler, K. Legg, E. Matthews, L. Mazzu, R. Ohms, C. Schreier, and J. Taylor. 2016. Integration of science and park management: A framework for developing partnership. NPS/NRSS/NRR—2016. National Park Service, Fort Collins, Colorado, *in press*.

Eurich, T. 2013. Bankable leadership: Happy people, bottom-line results, and the power to deliver both. Greenleaf Book Group Press. Austin, Texas.

Gallo, K. 2015. Guidelines for determining authorship on scientific and scholarly products developed by the Inventory and Monitoring Program. Memorandum. National Park Service, Inventory and Monitoring Division. Fort Collins, Colorado.

Hathi, S. 2015. Leadership communication for successful strategic change. Available from: https://www.melcrum.com/blog/leader-communication-successful-strategic-change. (Accessed May 2015).

National Park Service (NPS). 2015. Peer review, publication, and administrative recordkeeping requirements for scholarly and science information disseminated by the NPS Inventory and Monitoring Division. National Park Service, Inventory and Monitoring Division. Fort Collins, Colorado.

National Park Service (NPS). 2016. Natural Resource Stewardship and Science science communication framework. National Park Service, Washington, D.C.

Perkins, D.W., M. Bozek, M. MacCluskie, T. Philippi, A. Ray, W. Route, and D. Thoma. 2016. Excellent science in the National Park Service Inventory and Monitoring Division: Guiding principles and recommendations. Natural Resource Report NPS/WASO/NRR—2016. National Park Service, Fort Collins, Colorado, *in press*.

Welton, J.F., R.T. Belote, L.T. Williams, J.K. Keller, and E.C. Engel. 2006. Authorship in ecology: Attribution, accountability, and responsibility. Frontiers in Ecology and the Environment 4(8): 435–441.

Appendix A: Tools for Objective A

A

Tactic 1

Engage parks in the best alignment of IMD science, park information needs, and decision support

Tool #1

Initiate listening and planning sessions or meetings with parks to identify opportunities to consider tweaking monitoring design that does not interrupt ongoing efforts, to better communicate results, and to improve partnerships that result in science-based park management decisions. This can also be an opportunity to reinforce the value for the long-term objectives already established.

Tool #2

Make the opportunity to "debrief" with park staff following management decisions to determine if IMD science provided support. Discuss and identify future changes and opportunities.

Tool #3

Distribute network meeting notes to relevant park management staff. Ask if network leaders can be included on the email lists for park-based management notes, such as "Squad Notes."

Tool #4

The IMD's Central Office can work with NPS leadership to develop and communicate updated guidance on the potential role of the IMD in park management decisions. Flexibility to explore and negotiate shifting focus with parks could be considered.

Tool #5

Encourage network program managers to distribute the "Integrating Science and Management" report to their technical committee and board of directors, then establish a time to discuss and agree upon implementation steps appropriate to them.

Tool #6

Explore a means of tracking park natural resource decision-making processes and results of those processes. NPS staff could revisit and learn from this knowledge to ensure more effective integration of scientific information into future decision making. The summarized information would help raise awareness among parks of other parks that are conducting management similar to theirs. It would not attempt to describe all of the detailed circumstances contributing to taking an action or its outcome.

Evaluation

Consider tracking frequency of data used or requests for data. Determine if the trend in communications from park decision makers to network staff is increasing. If not, consider more opportunities to encourage park decision makers to reach out to network staff as they recognize the value in IMD science for decisions. Informally survey IMD and park management staff on knowledge of status and long-term success of management decisions.

A

Tactic 2

Make IMD databases and scientific information easy to find and access

Tool #1

Ask park staff where they find information and determine ways to integrate IMD information with those sources. It is typical for searchers to the use most convenient search mechanisms and then stop as soon as they reach minimally acceptable results. Consider providing links on websites in key locations or making Data Store content accessible through search engines and customized reports. The goal is to make IMD information a primary resource for park staff and researchers.

Tool #2

Communicate regularly the location of IMD information through InsideNPS, newsletters, email correspondence, and social media. Add links to the Data Store at the bottom of publications and email signatures.

Tool #3

Periodically advertise new science publications related to NPS sites by sending emails to listservs with links to new reports. An "NPS Science News Briefing" could consist of a summary list of scholarly and government reports found in the Data Store and broader systems like Google Scholar and Lexis Nexis.

Evaluation

Monitor usage statistics on any online databases used. Perform web searches to verify that search engines are retrieving IMD information. Periodically ask parks and networks of their awareness of IMD databases and science information locations. Monitor Data Store statistics for the download frequency of reports.

C

Tactic 3

Use InsideNPS to increase the IMD's visibility in NPS

Tool #1

Ensure that each network knows how to submit items to InsideNPS. This may be via a person at a park, region, or central office level.

Tool #2

The central office and networks periodically submit a news item and photograph to InsideNPS for publication. Examples of news items could include new reports, park discoveries, projects initiated or completed, or partnerships.

Tool #3

The Central Office and networks submit position vacancy notices, especially for key positions such as program managers, data managers, and ecologists, to InsideNPS for posting under the Jobs section.

Evaluation

Solicit input from network staff on whether they have received feedback as a result of InsideNPS articles; review analytics and number of page views of IMD items.

Tactic 4

Share IMD information with park decision makers in a variety of formats and venues

Tool #1

Listening sessions: Ask and practice careful listening to park needs; this is an important tool to help establish a partnership between the IMD and parks. Two-way communication will result in better understanding of the information decision makers need; joint evaluation of how the IMD delivers results of ongoing monitoring; and the most effective way to deliver science products for resource management purposes.

Tool #2

Data visualization: Web-based data visualization tools allow users to create custom-made charts and tables using monitoring data. IMD scientists and decision makers viewing data together through visualization tools can stimulate discussion about what data and analyses are most informative to park resource management and how best to apply them to decision making.

Tool #3

Produce technical reports: Reports are an important foundation of IMD science delivery. I&M networks need to deliver comprehensive results and interpretation on the status and trend of monitoring data that go beyond what is acceptable for a resource brief or even a scholarly journal article. Park resource specialists, as well as other stakeholders such as planners, often use these documents as the foundation for management decisions. (For example, IMD data provide a substantial baseline for Natural Resource Condition Assessments (NRCA) and for the natural resource sections of the State of the Park reports.)

Tool #4

Resource briefs: These short publications provide a way to summarize findings or provide updates on IMD activities. Resource briefs are written and designed for a management audience that may not possess technical expertise. The quality of briefs can be measured by evaluating accuracy of the content (supported by peer-reviewed material), readability for the intended audience, and effective use of design principles.

Tool #5

Technical support: Providing technical support to parks on activities outside of the monitoring plan can be an important role for the IMD. Networks have staff with technical expertise who can help parks develop better park-level monitoring activities, funding proposals, and management responses. Interaction with and support by IMD staff in these ad hoc activities establishes partnerships and increases the network staff's understanding of park needs, thus allowing networks to better deliver information to the parks.

Tool #6

Leadership teams and committees: There is significant value in network staff participating in occasional park leadership team meetings and park-specific committees. In addition, park staff can attend network technical and board of directors meetings. Although this may not be practical for all instances, phone conferences and exchanging meeting notes may help fill this gap if site visits are limited. This provides an opportunity not only for IMD staff to better understand park management priorities, but also to deliver information that is relevant to the planning process. Likewise, network engagement in technical committees at the regional or national level is a valuable opportunity.

Tool #7

Share the work of other networks: Many networks and parks have vital signs in common, and monitoring results from one network can be relevant to parks with similar resources. Keeping current with the related work of other networks and sharing that information with your network parks will increase the value and reach of our information.

Evaluation

Track data requests from park staff and usage of online tools that have a management focus (e.g., visualizers). Determine if the trend in communications from park decision makers to IMD staff is increasing.

A

Tactic 5

Facilitate training in the fundamentals of science-based decision-making

Tool #1

Create a workgroup to develop training(s) for target audiences emphasizing science-based decision-making and the adaptive management loop. The development of this training may involve tapping into outside organizations that have already developed similar trainings, which could be adapted to NPS needs. Consider contacting the NPS Office of Learning and Development for facilitation and coordination.

C Tool #2

Organize and coordinate a series of training sessions in structured decision making and decision analysis geared towards park managers and IMD staff. Consider seeking assistance from U.S. Geological Survey. Interdisciplinary training participants would ideally include a diverse group of IMD staff, NRSS staff, and park decision makers.

Evaluation

Participants can comment on course evaluation forms.

Tactic 6

Ensure that an IMD-focused component is included in new employee and related NPS training

C Tool #1

Review current content of NPS Fundamentals training. As needed, create a broad workgroup to develop materials for NPS Fundamentals that introduces the IMD, describes its role in the NPS, explains its functions and limitations, and includes the adaptive management concept. Consider a video conference or recorded video in addition to print materials.

C Tool #2

Coordinate with other NRSS divisions to craft and incorporate an NPS-focused natural science introductory training for NPS Fundamentals which incorporates the IMD with other natural science offices that are not located at parks. This provides the NPS employee attending the training with a basic understanding of natural science and the role of NRSS in supporting park resource managers.

Tool #3 C

Work with NPS management, other NRSS divisions, and those who design and conduct NPS resource management or superintendents' training to incorporate an IMD component. Emphasize the importance of the IMD in natural resources monitoring and decision making through adaptive management. Also, emphasize the utility of IMD products such as IRMA, mapping tools, and data visualizers to all NPS divisions; and the concept that the IMD exists, in part, to supplement parks' ability to conduct and interpret science.

Evaluation

Obtain feedback from NPS Fundamentals and other training evaluation surveys from students.

Appendix B: Tools for Objective B

B

Tactic 1

Establish and communicate accountability expectations for quality, scientific integrity, peer review, and authorship of scientific products

Tool #1

Follow authorship guidance established by IMD. For example, IMD staff should be considered a co-author if they conceived the idea or designed the study, participated actively in execution of the study, analyzed and interpreted results, or wrote the manuscript.

Tool #2

Specify in contracts and agreements the role of NPS scientists so that credit or authorship is given commensurate with the level of support or involvement of NPS staff. Take active roles in writing these contracts and subsequent publications if they pertain to a vital sign. This will encourage ownership by the NPS scientist, build bridges to other scientists, and build upon our collective science reputation.

Tool #3

Follow IMD-specific standards for peer review of the full range of IMD products. Communicate the standards to staff, partners, and contractors; make them readily discoverable by any data users, and support networks in meeting peer-review obligations.

Tool #4

Apply specific and comprehensive standards for quality control for data collected or managed by networks or the Central Office. Ensure the standards are readily discoverable by any data users.

Tool #5

Use the annual network program managers meeting to present the IMD leadership's science accountability expectations and solicit input. Ensure that managers communicate the information to all staff.

Tool #6

C

Create templates, standard language, website postings, etc. to communicate the standards and expectations. Be specific about how the standards apply to different activities, products, and publications. This allows IMD staff to see what those standards are, as well as provide an avenue for communicating the standards to an intended audience.

Evaluation

Encourage network managers to conduct listening sessions or conversations with network staff that address their understanding of expectations. Gain feedback for changes in guidance itself or in ways to improve communication of the guidance.

B

Tactic 2

Streamline the formatting and production of final reports

Tool #1

Develop and post templates for a range of IMD products, from short briefs, to reports in the publication series. Ensure templates meet NPS graphic identity standards and basic 508 compliance requirements. Strive to revise templates on a regular and predictable schedule.

Tool #2

Establish a cadre of IMD publication staff who are skilled in all aspects of report formatting and editing and who are knowledgeable about templates and standards. Also, consider agreements and contracts to provide this service. Develop a scheduling and submission process for science staff.

Tool #3

Network program managers and supervisors ensure that publication staff are being used and that scientists no longer need to format their reports.

Evaluation

Track number of reports submitted in compliance with formatting standards. Track timeframes from content development to final publication.

Tactic 3

Regularly publish scientific findings for each monitoring program

Tool #1

IMD leadership recognizes publications in the professional peer-reviewed literature as a high level of scientific achievement, which is a group success. IMD and NRSS accomplishment reports highlight publications, and authors are specifically recognized.

Tool #2

Include peer-reviewed publication of scientific findings as one component of a larger critical element relating to communication in the EPAPs of science staff.

Tool #3

Make publications widely available and in multiple formats. Offer hard copies to park resource staff, post to the IRMA Data Store, and place prominent links on network and park web pages.

Evaluation

Monitor effectiveness of EPAP elements. Track numbers and venues of published reports.

B

Tactic 4

Facilitate efforts for collaborative scientific publishing

C **Tool #1**
Establish a committee to support scientific collaboration and joint efforts to write and publish peer-reviewed articles. Put out an annual call to IMD science staff to develop ideas for a collaborative publication among the IMD, the NPS, and partners. (The 2015 special journal edition with *Ecosphere* is a good template.)

Tool #2
Seek opportunities and partners (e.g., USFWS, NOAA, The Nature Conservancy, academia) to co-fund monitoring research.

C **Tool #3**
Continue network request for proposal collaborations (either within the NPS or include external partners). Select projects that strengthen and elevate the quality of IMD science.

Tool #4
Identify and support opportunities for mentoring, where employees (especially early in their career) can cross-train and gain experience at parks, other networks, or the national level.

Tool #5
Collaborate with Research Learning Centers to develop a scientist-in-residence program at the network or park level (modeled after the NPS Artist-in-Residence program) where outside scientists would be enticed to work in an NPS setting. Consider aligning the scientific focus with investigating questions raised by IMD monitoring data. C

Tool #6 C
Build funding pools specifically for scientific collaborations at levels beyond the individual network (either within the IMD or with other agencies or partners) that will strengthen projects and elevate the quality of IMD science. Consider funding regional and national meetings to exchange ideas, develop mentoring, and create collaborative opportunities.

Evaluation
Monitor number of published reports with multiple authors. Monitor number of affiliations present in publication authorship. Monitor number of entities providing support in published works.

Tactic 5

Encourage and support IMD representation and participation at scientific meetings, conferences, and collegial gatherings

Tool #1
Staff and supervisors identify and agree upon priority meetings, and plan budgets and travel allotments to accommodate them. Encourage attendees to share (formally or informally) knowledge and experiences upon returning from conferences to broaden the impact.

C **Tool #2**
IMD and NRSS leadership recognizes staff who have presented papers at conferences. Summaries of the conference and the topic presented are highlighted in network or Central Office accomplishment reports and Inside NPS.

Tool #3
Support collegial gatherings and support systems similar to graduate school development opportunities.

Evaluation
Track numbers of staff attending and presenting at meetings and conferences. Evaluate the need for increased travel ceilings or budget.

B

Tactic 6

Improve staff skills in preparing and delivering technical presentations

C

Tool #1

Identify and work with communication specialists (e.g., NPS Learning and Development) to develop a compact, self-study course curriculum on presenting complex materials effectively.

Tool #2

Recommend that colleagues or co-workers have a chance to review presentations and give feedback on their effectiveness.

Tool #3

When warranted, include in staff EPAPs or IDPs completion of courses in DOI Learn on general topics of professional speaking and effective presentation skills.

Tool #4

Encourage all staff with public speaking or presentation responsibilities to record a video of themselves making a presentation. Provide a collegial atmosphere in which to review the video and get constructive comments on how to improve.

Evaluation

Obtain feedback from IMD peers on the quality of IMD staff presentations. Conduct self-assessment surveys on presentation competence.

Tactic 7

Improve staff skills in technical writing and editing

Tool #1

When appropriate, include in staff EPAPs or IDPs the completion of courses in DOI Learn on technical writing.

Tool #2

Recommend that writer-editor staff proofread and edit materials that are not intended to remain internal and provide feedback to authors.

Tool #3

Within an office, recommend that there is always at least one review by a second person of materials that will have broad distribution (e.g., briefs, newsletter, websites).

Evaluation

Monitor feedback from peer reviews. Solicit feedback from staff on training effectiveness. Conduct self-assessment surveys on writing competence.

Tactic 8

Provide web-based access to IMD data sets, and tools to improve their visualization, interpretation, and analysis

Tool #1

Develop an overall framework for exposing IMD data sets for direct access by end users.

Tool #2

Complete a pilot visualization project that allows web-based interactive access to a selected IMD data set. Solicit feedback from end users.

Tool #3

Integrate access to data sets and tools into network and IMD documentation and outreach materials.

Evaluation

Monitor website analytics to determine amount and extent of use. Consider setting up a mechanism, such as an email address, for users to provide feedback on particular webpages.

Tactic 9

Improve access to scientific literature

Tool #1

Obtain divisional subscriptions for priority journals.

Tool #2

Consider agency/department subscriptions through NPS Learning and Development or the Department of the Interior Library (Note: many electronic journals are accessible to DOI employees via doi.gov/library).

Evaluation

Monitor subscription use and requests for new subscriptions.

C

Appendix C: Tools for Objective C

Tactic 1

Use webinars to regularly share the progress and results of staff work

C Tool #1

Designate a Central Office staff position to arrange webinar schedules, manage licenses for webinar software, and troubleshoot technical problems during webinars. This position is also responsible for suggesting any training resources for webinar presenters, broadcasting announcements, and managing recordings.

C Tool #2

Openly solicit topics and encourage each network, on a rotating schedule, to present webinar content. Include presentations by park staff whenever possible.

Tool #3

Develop multiple series or webinar topic areas, including those that are directed towards data managers, ecologists, or specific vital signs.

Evaluation

Monitor the number of employees attending the webinar series. Evaluate attendee lists to determine if target audiences are being reached. Periodically solicit feedback and evaluation from attendees.

Tactic 2

Improve communication and collaboration with other NRSS divisions, directorates, and NPS leadership

C Tool #1

Circulate NRSS weekly and monthly reports and updates to all IMD staff.

C Tool #2

Appoint a Central Office lead to meet regularly with the other NRSS divisions to discuss mutual projects and share individual program information and initiatives. Relay this information to Central Office staff and to the networks, and facilitate cooperation among divisions.

Tool #3

Incorporate a regular session on improving communication and collaboration with NRSS into the annual IMD program managers meeting. Invite leads from the other NRSS divisions to attend or present.

Tool #4

On an annual basis, identify a topic for a Park Science article that spans multiple divisions. IMD leadership and supervisors provide support for IMD authors and contributors to the article.

Tool #5 C

Establish an NRSS work group to identify priority subjects that can be the basis for shared content in the NPS Content Management System. Subjects should serve as organizing concepts that span disciplines of all divisions. Develop a list of associated articles, map stories, and place stories that weave together a comprehensive perspective.

Tool #6 C

Publish an IMD newsletter annually that concisely highlights accomplishments, publications, initiatives, and specific benefits of IMD data and information. Intended audience, in addition to IMD staff and parks, is NRSS divisions and NPS leadership, partners, and cooperators in other agencies or organizations.

Evaluation

Track the number of new collaborative projects established between IMD and an NRSS division annually. Evaluate the success and determine if more projects are possible and helpful.

Tactic 3

Facilitate opportunities for network and Central Office staff to work temporarily in other offices

Tool #1

Provide detail assignments for network staff to work in the Central Office. Both telework and on-site details can be considered. Look for opportunities where input from field staff into IMD-wide projects would be particularly helpful.

Tool #2

Encourage Central Office staff to make network visits, including technical committee meetings.

Tool #3

Determine travel ceilings and, if needed, work to elevate ceilings to meet the demands required to fulfill detail opportunities.

Evaluation

Track number of staff details and temporary on-site assistance. Require the person on detail to submit a trip report (or equivalent) that summarizes activities, insights gained, and lessons learned. Track associated travel expenses; evaluate overall effectiveness annually.

Tactic 4

Encourage and support multi-network collaborations and project work

Tool #1

Schedule regular calls among multiple networks. Calls can be organized around positions (e.g., regular data manager calls) or specific topics.

Tool #2

Survey or solicit ideas from network and regional program managers on where expertise and gaps in staffing exist. Identify priority areas and commit to sharing science, data management, administrative, or communication duties.

Tool #3

For networks that have vital signs in common, review the status of protocols, SOPs, databases, and field resources, identify areas where partnership will be beneficial, and commit to working collaboratively.

Evaluation

Track partnerships reported upon in the annual administrative report. Solicit feedback from program managers and staff on their satisfaction with sharing resources.

Tactic 5

Develop an annual process for assessing network needs

Tool #1

Take full advantage of network reporting (annual reports and workplans, Protocol Tracker) as information sources and tools to annually identify network needs and gaps.

Tool #2

Use established IMD meetings (e.g., program manager and data manager meetings) to further refine and prioritize emerging common needs and gaps for which Central Office assistance is required.

Evaluation

Monitor Protocol Tracker use statistics regarding internal communications; evaluate recommendations made by network staff at annual meetings.

C

Tactic 6

Improve communication of IMD strategic plans and directions to networks, provide network representation during development, and multiple feedback and review opportunities

Tool #1

Use established IMD meetings for discussion and feedback on IMD management issues. Consider structured listening sessions as a framework for gathering input.

C Tool #2

Announce comment periods for IMD staff to review and provide comments on IMD management documents.

C Tool #3

Create a standard section in IMD planning and guidance documents that describes the review and input process for network staff. Communicating this involvement will further assist in building IMD staff "buy-in" for management efforts. This can set a standard for collaboration on other internal planning efforts (within networks, regions, etc.).

Tool #4 C

Store and update management documents and guidance in one online location. Consider Dashboard to host or provide links to these documents. Be sure to delete outdated information. Remind IMD staff of this location in other communications such as emails and newsletters.

Evaluation

Monitor the number of employees providing input and the overall content contribution of employees (word counts of suggestions, number of comments, time spent in listening sessions, etc.)

Tactic 7

Distribute news, notes, and updates regularly

Tool #1

Hold regular, short meetings for staff to provide updates on their work and identify areas of collaboration. "StandUp" meetings every week or two, lasting no more than 30 minutes, can be effective. During the updates, identify items that should be communicated more widely with other IMD staff.

C Tool #2

Distribute regular updates from the Central Office to IMD staff. The ideal timeframe is every month or two, but no longer than three months between updates. Use an email listserv, newsletter, or shared document for distribution. Consider posting a centralized draft version for a certain time period to solicit content from other staff. Encourage supervisors to solicit input from their staff on updates relevant to the IMD audience.

C Tool #3

Create a semi-annual update from networks that is distributed to all of the IMD. Similar to the Central Office update, complex formatting isn't necessary; rather, a simple presentation of news, staff updates, partnerships or collaboration between networks are highlighted. Networks submit information to regional program managers, or to a designated Central Office staff member.

Tool #4 C

Create an annual "IMD Impact" report that highlights the IMD's contributions to park management decisions and science findings. Include brief narratives that describe ways in which IMD science has been applied in and benefits received by parks. The report's intended distribution would be all IMD as well as NRSS and NPS leadership.

Evaluation

Solicit feedback on the use and value of these updates during the annual network program managers and data management meetings. Ask content contributors if they are contacted as a result of the updates. Include a link on the updates to a Google form where recipients can provide feedback or suggestions.

Tactic 8

Provide organizational charts and update contacts regularly

Tool #1

Use SharePoint or the IMD Intranet site to post org charts; eventually move to the IMD Dashboard workspace. Include links to organizational charts for NRSS Divisions, and charts showing how NRSS fits into the NPS organization.

Tool #2

Create a single source for an IMD staff contact list that is kept up to date. Allow searching by name, title, or office, and provide the ability to quickly create a list of email addresses.

Tool #3

Include in Central Office staff lists a brief description of each person's primary job duties, so that field staff better understands who does what and who to contact if they have questions.

Evaluation

During an IMD-wide employee survey, include a question regarding staff's understanding of NRSS and IMD organization, staff duties, ease of finding information, and whether it is up to date.

Tactic 9

Develop and adhere to best practices for organizing, conducting, and participating in meetings

Tool #1

Establish a list of basic best practices for meetings. Post items that apply to all meetings and group work (such as rules of engagement) in conference rooms or at the top of agendas. Review practices at the initiation of a project, or when a new team or work group meets for the first time. Refer to the practices throughout meetings to prevent or manage issues as they arise. See Appendix E for examples of best practices.

Tool #2

Create a meeting and communication structure for large, recurring, or complex projects. This includes the meeting and agenda structures, roles and authority of participants, communication directives (who needs to stay in contact, how will they communicate, and when), and how conflicts or disagreements will be resolved. It may also identify the role of "translator" personnel that may be needed for communicating between groups of staff with very different skills and background.

Tool #3

Train key staff (e.g., those with regular leadership roles in group work) in the concepts of leadership communication, facilitated dialogue, negotiation, and conflict resolution. Consider enrolling staff in the LEAD program from the Office of Personnel Management.

Evaluation

Annually review broader guidance such as rules of engagement during an all-staff meeting. Allow for public comments as well as an opportunity for private or anonymous suggestions. Leaders for specific projects should provide a mechanism for feedback on meeting communications. It can be built into agenda items or solicited outside of meetings.

C

Tactic 10

Develop tools for staff to find, submit, and share information

C Tool #1

Finalize the Protocol Tracker application; inform staff of how to use it, update it, and run reports.

C Tool #2

Expand and re-brand Protocol Tracker to encompass additional IMD information, including IMD staff information. Solicit requirements from all users for updating and reporting on the information.

C Tool #3

Develop standard methods and tools for networks to submit assistance requests to Central Office staff.

Tool #4

Through the Internal Communications Workgroup, solicit additional needs or ideas of tools or processes that would be helpful to improve how staff find, submit, and share information.

Evaluation

Monitor the use and application options of Protocol Tracker. Solicit feedback from staff or through the Internal Communications Workgroup on the ability of staff to find, submit, and share information.

✓Tactic 11

Develop standardized IDP and EPAP critical elements regarding communications and teamwork

Tool #1

Use and promote the sample language provided in Appendix E. Consider including the standards as part of staff critical elements.

Tool #2

Task the Internal Communications Workgroup to develop or refine standards for critical elements.

Tool #3

Support communications training and independent study that staff may identify in their IDPs.

Evaluation

Track ratings of WASO IMD employees who have used the standardized language. Solicit supervisors for feedback of how they feel the standards are working to improve employee communication skills.

Tactic 12

Recognize and reward IMD staff for innovative internal communications

Tool #1

Open a nomination period for staff to submit candidates for special recognition. Select outstanding examples of communication and share the story and the results widely with all IMD staff.

Tool #2

Reward employees with STAR Awards (monetary or time off) for specific communication initiatives or successes. Share news about the initiative with all staff.

Tool #3

Make a regular practice of mentioning staff communication accomplishments during staff or group meetings, as a means of both giving recognition and keeping the importance of communication in the forefront.

Evaluation

Track nominations and awards; request feedback from regional and network program managers on their effectiveness.

Appendix D: Tools for Objective D

D

Tactic 1

Create employee/career profiles to share stories about how IMD staff got into their line of work

Tool #1

Create brief biographies of IMD staff focusing on science careers similar to the NPS Explore Nature page on careers at http://www.nature.nps.gov/careers/index.cfm.

Tool #2

Produce quality videos of IMD staff at work. Consider creating a series of relatable short videos on different aspects of IMD professions (e.g., field ecologists, data managers, GIS specialists) or stories about different monitoring activities in networks. Note that these are stories about the scientists or other IMD staff, and are not focused solely on the science or work itself. The videos intentionally focus on personal stories in the midst of conducting science/work.

Tool #3

Create linear digital content for online users to follow one or more individuals through a field season as they collect data. This involves social media through a featured blog or microblog over a set timeframe. This may include written blog posts, photos, and/or video content.

Evaluation

Evaluate the audience use statistics for these products. Solicit profiled staff members to see if they have received feedback as a result of these stories.

Tactic 2

Promote network activities and research in popular press articles

Tool #1

Provide guidance and/or training on creating short and succinct news releases about activities, research, and sharable findings with the press and other outlets. Include suggestions for optimal writing styles, length of articles, proper questions to address (who, what, when, why, where, how), what supplemental media to include (photos, video, etc.), and targeting the correct audience.

C Tool #2

Designate an individual within the IMD or NRSS to serve as a liaison between networks and national level NPS media, such as a Public Information Officer (PIO). This individual will facilitate the distribution of press-worthy network stories to InsideNPS or public facing venues by both soliciting stories from networks, and by working with the media to promote network narratives.

Tool #3 C

Determine local or regional outside venues such as online journals, science blogs, and traditional newspapers and magazines for the release of network stories. Work with these venues and an NPS PIO to determine how and when to promote network research and activities with these groups.

Evaluation

Track the number of published popular press articles.

D

Tactic 3

Provide training and support in public affairs and addressing the media

Tool #1

IMD managers set a clear understanding with staff about the circumstances for any newsworthy information to be vetted before being sent to the media or to another large audience. This helps to ensure the integrity of the information reflecting on the network, the IMD, and the NPS in general. Provide information on those staff considered to be key contacts relating to public affairs situations.

Tool #2

Each network identifies and contacts one or more park-based or regional Public Information Officers (PIOs) to learn about "hot topics" for their area. This contact is beneficial when a network is uncertain about how to address the media, or if the subject of media inquiries is considered controversial for that specific park. Note: some topics, such as the Deepwater Horizon incident, should only be handled by someone designated as a PIO.

Tool #3

Take public affairs training offered by the Office of Communications and familiarize IMD staff with the guidelines outlined in the NPS Public Affairs Guide.

Evaluation

Track number of IMD staff trained on and performing public affairs duties. Solicit feedback from those staff to determine if they need additional support or training.

Tactic 4

Provide citizen science program support

Tool #1

Create standards for data collection for events, such as phenology surveys and bioblitzes. Coordinate (or delegate) the collection and analysis of the data during an event, and ensure the use of and training on the most appropriate technology for the event. Coordinate with national programs such as iNaturalist, eBird, GreatNature Project, FrogWatch USA, BugGuide, National Phenology Network, BudBurst, or others.

Tool #2

Develop instructions and best practices to inform networks and parks about the how to conduct park or multi-park citizen science events. Train NPS staff and partners involved in the events, develop documentation and guidance, and communicate desired outcomes.

Tool #3

Provide guidance and tools, where possible, on evaluating and managing data collected via citizen science projects.

Tool #4

Help a park organize and host a small-scale bioblitz. These events focus on finding and identifying specified taxa in a certain area over a short period of time. The primary goals of a small bioblitz are to provide a fun and authentic science experience for volunteers and to contribute to the park's biological inventory or census.

Tool #5

Provide a species and/or phenology checklist for informal visitor observation and recording of data. Keep a current monitoring record posted for public view in the visitor center.

Tool #6

Collaborate with park interpreters to develop some citizen science projects that can be implemented on a drop-in basis for park visitors. Provide stand-alone signage and instructions that could be posted in visitor areas for anyone looking to contribute to science at the park. Visitor center staff should be trained in the procedures to answer questions, but IMD or park resource staff would manage the program and

Tactic 4
Continued

associated information.

Tool #7
Collaborate with an affiliated Research Learning Center (RLC) to identify new citizen science ideas, or to contribute to existing RLC projects that are underway.

Evaluation
Review evaluation forms handed out to participants at the conclusion of citizen science events. Be sure to work with interpretation/education staff or other NPS staff familiar with rules regarding soliciting feedback from the public (also, see Appendix E). Track numbers of participants at events. Summarize volume or counts of high-quality data acquired during events. Solicit input from IMD staff concerning accuracy and relevance of gathered information.

✓Tactic 5
Present talks for in-person or virtual audiences

Tool #1
Learn the skills required to present remotely including the basic technology involved in presentation. There are many different platforms through which virtual presentations may occur. Before any virtual presentation, it is vital to consult with the presentation coordinator to be prepared for the flow, responsibilities, and technological components of the platform.

Tool #2
Provide basic public speaking training to staff as requested. Presenting at conferences or meetings requires knowledge of the audience, a timely and succinct presentation (with or without graphics), and confidence in knowledge of the material.

Tool #3
Look for opportunities to present to students and classes. Adapt your materials for the audience. Prepare with teachers ahead of time to make sure to cover the educational standards that they require (seek advice from an NPS education specialist regarding Common Core Standards and consult http://www.nps.gov/teachers/index.htm). For a university classroom, there is usually more flexibility in content and complexity to the presentation. In both cases, leave room for questions and discussion.

Evaluation
Conferences and virtual presentations often include evaluation forms from which some information could be gleaned. An honest discussion with the teacher, professor, or facilitator about the event is a reasonable means to evaluate the presentation as well.

Tactic 6
Host booths at relevant events

Tool #1
Collaborate on public outreach with park interpreters and natural resources staff at special events. Different approaches are possible: (1) the park may invite an IMD staff person to help with a booth or a talk during an event; (2) IMD staff may generally represent the NPS at a (non-NPS) event which may (or may not) reflect on a local park, thereby making the IMD staffer a proxy for that park; or (3) IMD staff and park staff participate jointly with a booth at an event.

Tool #2
Present a booth at a science event as a general NPS science entity. This type of booth is focused on science and can be targeted toward peer scientists such as at a scientific conference, or toward young aspiring scientists such as a high school science fair. These booths may include demonstrations of methods, experiments, and brochures. The level of technical scientific engagement at these events begins at a more complex level than for non-science public outreach events.

D

Tactic 6
Continued

Tool #3
Booths at public events such as local fairs are best served with interactive displays or natural resource based games. It can be difficult to compete for an audience at a fair or event with many other flashy attractions. For these events, develop interactive, educational, and fun activities or games involving locally relevant resources or resource issues. Once the participants are attracted to the booth or engaged in something fun, this tends to stimulate further interactions and discussions.

Evaluation
Track the number and quality of interactions the booth elicited. Also, request feedback on the booth and activities from others with separate booths at the same event.

Tactic 7
Ensure the IMD participates in larger NRSS and Office of Education and Outreach (OEO) communication efforts and strategies

C Tool #1
Establish an individual, workgroup, or office to maintain channels and standards for communication between networks, OEO, and the other offices of NRSS. This individual or group will familiarize themselves with the science communications coordinator (or equivalent) at each network as well as with web and outreach liaisons at OEO and other NRSS divisions.

C Tool #2
Solicit content from networks worthy of promotion and distribution through national NPS natural resource venues. In turn, communicate national natural resource initiatives and topics to networks to promote on a local level. Key messages about specific topics or programs should be shared with all relevant staff.

Evaluation
Solicit feedback from staff meetings of networks, OEO, and other NRSS offices, regarding the efficiency and effectiveness of these internal communications. Monitor audience-use statistics of the distributed content to determine the best venues for sharing national level IMD information.

Tactic 8
Develop and maintain relationships with park-based interpretation, education, and other staff

Tool #1
Create network-wide listening sessions, road shows, or science days where resource managers, IMD staff, and other scientists can share current data and findings with colleagues and park education and interpretation staff. Park staff in any division are potential participants, as are park supporters; superintendents and deputies; natural resource management personnel; interpretive rangers; education and volunteer coordinators; maintenance staff; law enforcement rangers; park volunteer citizen scientists; and park friends groups.

Tool #2
Establish regular “brown bag” lunch presentations or other periodic updates such as yearly or seasonal informational staff meetings with parks. These meetings could be park-wide or focus specifically on the interpretation or resources management divisions.

Tool #3
Ask park staff to contribute to IMD newsletters or social media and vice-versa in an effort to increase collaboration and reach the widest possible audience.

Tactic 8
Continued

D

Tool #4
Strive to create and maintain individual relationships with network park staff regardless of their position. This creates a stronger understanding of the IMD and supports a better reputation for IMD work within parks.

Tool #5
Take advantage of ad hoc interactions between park staff and field crews. Parks' first-hand knowledge of the resources field crews are monitoring and local logistics is invaluable; through positive interactions, park staff will likely be among the most ardent enthusiasts of your work. The science exchange through these relationships is often passed on to others.

Tool #6
Work with each network park's interpretation division to establish a contact through which new information can be disseminated and coordination of products and events can occur. Visit (in person or remotely) with seasonal interpretive staff to discuss how IMD science is part of a larger picture of science activities in their park or network. Discuss the IMD's role in supporting parks with long-term monitoring. Respond to interests and concerns of seasonal staff.

Tool #7
Invite a park interpreter to accompany network staff during field work, which can provide interpreters first-hand experience and understanding of monitoring basics.

Evaluation
Solicit input from park staff on the effectiveness and professionalism of the IMD. Use listening sessions to guide future communication work.

Tactic 9
Create toolkit for park interpreters about the IMD (based on Natural Sounds workbook)

C

Tool #1
Work with Washington Office (WASO) interpretive staff to identify the IMD's themes. Develop these themes into stories with examples of how long-term monitoring is conducted and why it is important to the natural and cultural history of the parks.

C

Tool #2
Compile the stories into a publication that is made available to all interpreters Service-wide. Work with Harpers Ferry Center to develop the booklet in line with NPS Graphic Identity principles. The booklet will include a map of the I&M networks and lists of the parks that comprise each network, contact information for each network (not necessarily specific people, as these will change over time), and links to more in-depth subject matter.

Tool #3
C

Create a presentation to accompany the release of the IMD booklet. Provide each network with a copy of this program and encourage them to take this show to their parks (personally or virtually) and use it as a way of introducing the book and making personal connections with park interpreters.

Evaluation
Things to monitor include: number of contacts made between network staff and park interpreters (how many are initiated by the park interpreters? How does this compare to pre-release of the booklet?); list of programs provided at parks that incorporate IMD data; and number of long-range interpretive plans that include IMD-relevant themes.

D

Tactic 10

Produce resource brief and newsletter publications

Tool #1

Review the network's current communications tools and identify a plan for how the network can best use briefs and newsletters. Consider producing a set of park-specific briefs summarizing monitoring completed for each protocol. Consult guidance and use or modify templates provided by the Central Office to suit needs of the network.

Tool #2

Maintain the Science Communication Workgroup or other communities of practice within the IMD to provide evolving guidance about the effectiveness of brief and newsletter publications.

Evaluation

Solicit feedback from NPS staff regarding the value of resource briefs and newsletters. Consider technical committee meetings or other gatherings to gauge park satisfaction. Every few years ask for specific recommendations to improve the utility of these publications.

✓Tactic 11

Develop and promote park-based species checklists

Tool #1

Tell parks about NPSpecies "widgets" that are available as CMS elements for placement on park websites. (These widgets pull and format data directly from NPSpecies.) Work with the parks to review list content and update species information as needed; emphasize the link to "make a suggestion" on species list content.

Tool #2

Talk with park resource and interpretation staff about species lists, and if there is additional information they'd like to see or distribute. As an example, Devils Tower National Monument added "flower color" as a tag to selected plant NPSpecies records, so they can print lists that include this information for visitors. Other ideas might be "watchable wildlife" lists, list of trees, etc.

Tool #3

Work with a communication specialist to download species lists from NPSpecies and format into practical, portable, hard-copy checklists. Distribute at visitor centers and post a .pdf on the park website. Based on how frequently information changes, update regularly. (Make sure to include checklist creation date on the printed version.)

Evaluation

Track number of suggestions submitted to NPSpecies; number of lists printed and distributed. Review comments and feedback received by visitors.

Tactic 12
Develop science communication skills

Tool #1
Host training provided by the Alan Alda Center for Communicating Science (http://www.centerforcommunicatingscience.org/improvisation-for-scientists/). This training highlights the importance of storytelling, paying attention to your audience and their reactions, and adjusting on the fly. Consider regional offerings to attract IMD staff from multiple networks.

Tool #2
Encourage and provide time for staff to develop skills by reading best practices guidance, watching video examples, and practicing skills with others.

Tool #3
Use Appendix E for training resources. In general, consider the following:

- Writing skills: Eppley's interpretive writing course, Plain Writing Act of 2010, HemingwayApp.com
- Presentation skills: Eppley's interpretive formal talk course, Alan Alda Center for Communicating Science, Toastmasters Clubs
- Digital media skills: Writing for the Web training, NPS social media guidebook, NPS digital media for interpreters training, Basic and Intermediate CMS course on DOI Learn
- Videography: NPS Videography Workshop, Lynda.com video tutorials, Audio Description for online videos training by Harpers Ferry Center
- IMD Communities of Practice: Science Communication Workgroup, IMD filmmaking subgroup

Evaluation
Solicit feedback or course evaluations for staff training. Use performance measures or development plans to track improvements in skills.

Tactic 13
Provide publications training

Tool #1
Place a course request through Harpers Ferry Center for "Producing NPS Publications." Their week-long, in-person training has been offered numerous times to park interpretation staff and has been well-received.

Tool #2
Contact NPS Learning & Development Office for assistance in developing a new publications course directed towards the specific needs of NRSS publications.

Tool #3
Purchase subscriptions to lynda.com (online training provider) for participants. Determine the graphic design and software training courses for participants to complete. NPS graphic identity and accessibility requirements will need to be covered separately.

Evaluation
Course evaluation forms submitted by participants. Determine remaining needs for similar training and provide suggestions for future actions. Evaluate quality and consistency of publications across the IMD both before and after training.

D

Tactic 14

Provide coordinated website services and management within the IMD

Tool #1

Identify a webmaster for the IMD organizational site and affiliated pages under the "Explore Nature" heading for nps.gov. The webmaster should be trained in the nps.gov CMS procedures and organization. Additional skills needed are writing for the web and graphic design. The webmaster will be on relevant committees and teams for collaboration and alignment with other webmasters in NRSS and throughout the NPS.

Tool #2

Within the IMD, develop strategy and plans for creating CMS subject sites and shared content, with multiple network staff contributing CMS articles on topics of high priority or interest. Use the NPS Regional Webmasters to reach out to the broad NPS webmaster community, especially for distributing or soliciting shared content needs. Encourage parks to place the shared content on their relevant web pages.

Tool #3

Evaluate the content, traffic, and effectiveness of IMD websites currently hosted on science.nature.nps.gov. Develop several pilot CMS network sites; determine if CMS should replace existing network and Central Office sites or if a hybrid solution of both CMS and science.nature.nps.gov (or other options) would be most effective.

Evaluation

Regularly monitor website analytics for evaluating changes in content and topics. Within the confines of CMS, test different topics and wording to see how traffic distributes among the webpages. If needed, look to promote websites through social media channels, links on other websites, links in publications, etc. Solicit input from network and park staff on whether the services are meeting their communication needs.

Tactic 15

Provide social media coordination and promotion

Tool #1

Establish a team of staff members responsible for leading and promoting IMD networks on social media. These positions require the following skills: digital image manipulation, ability to engagingly present scientific information for a general audience, knowledge of readability statistics, interpretive writing, familiarity with social media use, knowledge and ability to exercise judgement about how to publicly represent the agency (i.e., public affairs). These staff create IMD social media guidance documents, participate on NPS social media committees, regularly attend Digital Media for Interpreters training, and stay abreast of changes to guidance.

Tool #2

Determine appropriate social media venues and establish IMD-wide accounts (prioritize social media platforms that networks are currently using and consider ones that are in use by other NPS entities). Solicit network communicators to submit material for posts (text, photographs, video clips, etc). Tag, share, like, link, etc. to connect with other NPS social media sites to broaden the reach to audiences. Work with park staff to share content and stories related to that park. Encourage cross-posting where possible and appropriate to leverage the greatest distribution of science information through social media.

Tool #3

When appropriate, respond to social media comments on posts in a timely and professional manner. This allows the reader to engage with the IMD in a more profound and direct way, which ultimately generates more understanding of the program and science perspectives.

Tactic 15
Continued

Tool #4
Regularly develop and submit posts and other social media materials to NRSS staff via the Google site for NRSS Explore Nature. This page allows users to submit new social media posts for review, review all of the posts that have been submitted, share ideas, explore a library of research and policy documents.

Evaluation
Monitor social media analytics for audience use. This can be in the form of use statistics, "likes," or comments on a post. Solicit input from network staff on whether the tools are meeting their communication needs.

D

Tactic 16
Provide videography training and services

C

Tool #1
Determine IMD central office staff member responsible for managing video support services. Participate on NPS video media committees and stay abreast of changes to guidance. Communicate with networks and workgroups to keep them informed of relevant information and best practices. Knowledge of video media creation is necessary to help provide support and guidance to network staff. Staff member is also responsible for coordinating IMD-wide video projects.

Tool #2
Identify and arrange video services available to IMD staff. This may include contracts, CESUs, Harpers Ferry Center, IMD or other NPS staff, details, internships, and student collaborations. Solicit NPS staff for feedback on skills available internally. Considering working with interpretation and education staff for content creation and audience knowledge.

Tool #3
Provide ability/training to create original video media with designated IMD staff, stationed both centrally and at networks. The following skills are required: production planning, camera operation, audio recording, lighting design, interview directing, post-production editing, motion graphics/title creation, YouTube/nps.gov uploading distribution knowledge and access, audio description recording and editing (accessibility requirement), caption track creation (accessibility requirement), and knowledge of audience.

Tool #4
Investigate NPS footage libraries held at central, IMD, and other park offices for future use in IMD video productions (typically considered "b-roll"). Create a method through which an individual at a network can access or know where to access b-roll.

Tool #5
C

Provide video production and distribution guidance for the IMD including Section 508 compliance. See Appendix E.

Tool #6
C

Maintain and manage the IMD central office YouTube channel (https://www.youtube.com/user/IMPNPS) and communicate how networks can contribute content to this channel.

Tool #7
Consider using video media to complement other IMD videos, such as https://www.youtube.com/watch?v=MZ7Xtk4F5mk that provide simple, overarching examples for communicating the basics about the IMD. One goal of this could be to equip

D

Tactic 16
Continued

IMD and other NPS staff to deliver a "30-second elevator pitch" when needed.

Evaluation
Monitor number of online distributed videos and their associated audience statistics. Solicit input from network staff on whether the services are meeting their communication needs.

Tactic 17
Increase audience engagement with interactive media and displays

Tool #1
Work with network parks to fill niches and enhance digital experiences at park visitor centers. Display IMD videos, apps, or data visualizer tools at visitor centers in coordination with individual parks. IMD staff should seek common areas of interpretive needs/interests with park staff to conceptualize, fund, install, and train on the use of IMD media at visitor centers.

Tool #2
Work with network parks on the development of park waysides, interpretive displays, and print media. The IMD and network parks mutually benefit when relevant science is included in park media.

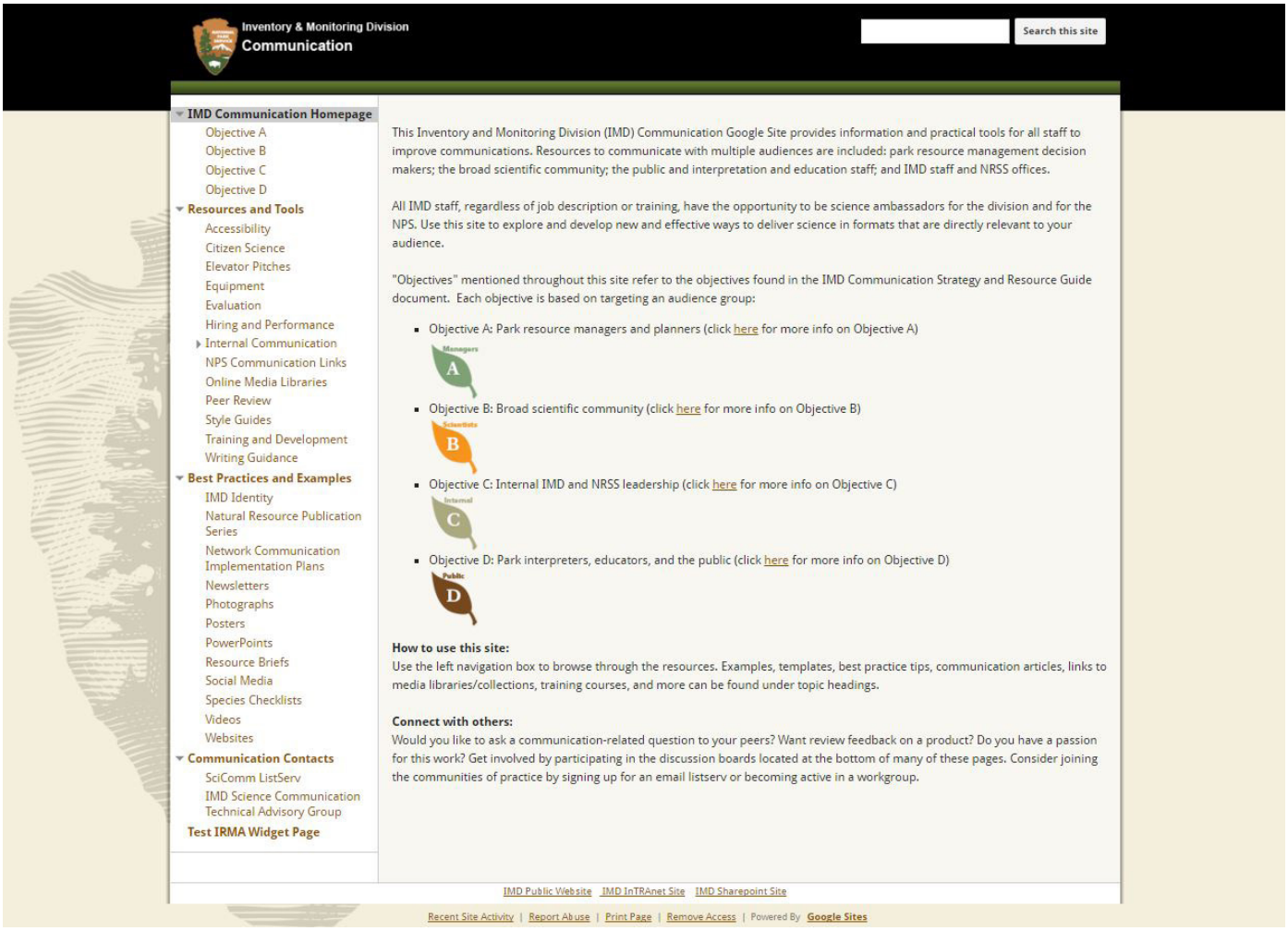
Tool #3
Consider having IMD staff available to present on pertinent topics and findings at park events such as After Dark in the Park, community meetings, or other park-based lecture events when time allows.

Tool #4
Offer to review science-based interpretive materials as subject area experts (or refer park staff to other scientific experts) whenever possible.

Evaluation
Seek results of park-based evaluations relative to products supported by the IMD. If necessary, develop or assist in the development of evaluation tools for newly installed media to gauge success. Document number of requests by parks for IMD staff to review interpretive materials.

Appendix E: Digital Communication Resources

In order to provide digital files and stay up to date on guidance, the resources for Appendix E are maintained online. Below is a screen-shot of the IMD Communication website, although the appearance will change through time. This site contains numerous resources for conducting and planning communications activities, including: best practices guidance and examples, templates, information on training, hiring, performance, contacts, and media libraries, and discussion forums. The IMD Central Office is responsible for the overall upkeep of this site, but all IMD staff can contribute content.



Appendix F: Network Communication Implementation Plan

The IMD Communication Strategy is intended to serve as the basis for practical, network-based communication implementation plans. Networks can pull elements from this divisional strategy to create an actionable network workplan that is tailored to fit individual network needs. Implementation plans are intended to be short, succinct, one- to three-year plans that include background information, chosen strategies, and a general schedule. Reporting on progress and accomplishments would occur as part of the network's Annual Administrative Report (AAR). An example developed for the Heartland Network is provided below.

Heartland Network (HTLN) Communication Implementation Plan

Authors Note: The intent is for the following information to be integrated into our annual administrative reports and workplans. Networks may choose to develop their own multi-year communication strategy. For this example, I focus exclusively on Objectives C (internal) and D (public). Our current administrative report and workplan format adequately capture most (all) activities associated with Objectives A (management) and B (scientific community). The IMD Central Office is actively reviewing and revising guidance regarding the content and process for administrative reporting. As such, I consider this plan a proof of concept of how networks can draw from the resource guide and align their individual activities with IMD strategies. Mike DeBacker (Program Manager, Heartland Network)

Intent and Reporting

This plan is intended to guide and align HTLN communications for the next fiscal year. Here we focus on implementation of IMD Communication Strategies C (internal audience) and D (public audience). (See author's note.) Overall planning and resource materials for this document are drawn directly from the 2016 IMD Communication Strategy and Resource Guide.

Objective C

IMD staff, NRSS staff, and NPS leadership are well-informed and coordinate activities and goals

IMD Strategy C1: Support an environment of continuous learning where experience, success, and lessons learned are openly shared and discussed.

- IMD Tactic 2: Improve communication and collaboration with other NRSS divisions, directorates, and NPS leadership.
    - HTLN Tools: Continue to serve as IMD representative to the NRSS Outreach Technical Advisory Group (OTAG)
    - HTLN Tools: Continue to serve as chairperson for the BRD, EPMT effectiveness monitoring workgroup

IMD Strategy C2: Create and support opportunities for networks to collaborate among themselves. Recognize and share successes that result from partnerships

- IMD Tactic 4: Encourage and support multi-network collaborations and project work
  - HTLN Tools: Continue collaboration among NGPN, GLKN and IMR networks with Rocky Mountain Bird Observatory and Avian Knowledge Network.
  - HTLN Tools: Continue to serve as chairperson of the IMD science communication workgroup.

IMD Strategy C5: Develop and maintain tools that support and improve internal communication.

- IMD Tactic 9: Develop and adhere to best practices for organizing, conducting, and participating in meetings
  - HTLN Tools: Continue monthly subject area meetings with staff using best practices to ensure meetings are efficient, information is relevant, and communication is two-way.

Evaluation Criteria for Objective C

- Informal staff evaluation of the usefulness of monthly meetings
- Number of HTLN staff hours contributed toward work and advisory groups

Objective D

Public audiences understand, value, and are inspired by the work the IMD does as part of the NPS

IMD Strategy D2: Leverage the experience, skills, and knowledge of park interpretation and education staff to connect with public audiences.

- IMD Tactic 4: Provide citizen science program support
  - HTLN Tools: As requested, support MWR centennial BioBlitz event at Cuyahoga Valley National Park.
  - HTLN Tools: Provide planning and data management support to micro-BioBlitz events at Hot Springs National Park and Effigy Mounds NM and others as requested.

- IMD Tactic 5: Present talks for in-person or virtual audiences
  - HTLN Tools: Continue use of HTLN's key communication message - The Heartland Network is protecting the habitat of our heritage.
  - HTLN Tools: Encourage staff to become fluent with this Heartland Network elevator speech.

The purpose of the HTLN is to collaboratively develop and conduct scientifically credible inventories and long-term monitoring of park "vital signs" and to distribute this information for use by park staff, partners, and the public, enhancing understanding which leads to sound decision making in the preservation of natural resources and cultural history held in trust by the NPS.

- IMD Tactic 6: Host booths at relevant events
  - HTLN Tools: Participate in park sponsored special events as requested (e.g. Carver Days at George Washington Carver NM, Biodiversity Day at Arkansas Post NM).

- HTLN Tools: Distribute portable science education panels for display at parks upon request.

- IMD Tactic 8: Develop and maintain relationships with park-based interpretation, education, and other park staff
  - HTLN Tools: Continue effective communication (via emails or participation in meetings) with park staff to inform parks of interesting outcomes of HTLN monitoring and to announce planned activities.
  - HTLN Tools: Integrate formal and informal consultation between HTLN staff and interpretive staff while network staff are on-site collecting monitoring data.
  - HTLN Tools: Update and distribute seasonal interpreters training material to parks to facilitate use of network information and expertise into park interpretive programming.
  - HTLN Tools: Continue to develop and implements lesson plans utilizing HTLN data and expertise:
    - Republic High School AP Biology lichen ecology study
    - General prairie vegetation study at GWCA

IMD Strategy D3: Communicate research results and their present and future value.
- IMD Tactic 10: Produce resource brief and newsletter publications
  - HTLN Tools: Continue resource briefs that are a one-page synopsis of monitoring reports. These will contain updates on resource conditions and trends that may be incorporated into interpretive programs.

IMD Strategy D5: Employ new media technologies to engage audiences.
- IMD Tactic 14: Provide coordinated website services and management within the IMD
  - HTLN Tools: Develop and promote the use of shared content through the NPS content management system.
  - HTLN Tools: Work with park managers to seek approval and implement the NPSpecies widget on park websites.

Evaluation Criteria for Objective D
- Website analytics for HTLN webpages and shared content on park webpages
    - Number of network parks with HTLN shared content on park site.
    - Number of park websites that enable visitors to create species list using the NPSpecies widget.
    - Number of visitor downloads or print inventory of activity for "Every Kid in the Park"
- Obtain park staff feedback and visitor numbers for success of BioBlitz events
- Number of events attended by HTLN staff
- Number of requests by park staff for display materials for events
- Number of informal meetings and projects with park interp/ed staff
- Number of briefs produced for interpretive audience

Appendix G: Communication Staffing Analysis

General Considerations

Communications work requires a professional skill set. Communication products and services in the NPS must meet a high standard of accessibility, design, functionality, and readability for both internal and external audiences. It is inefficient and impractical to assign professional communication duties to staff who may lack the experience, training, equipment, and time to successfully accomplish the tasks.

Analysis of Staffing Capabilities

An analysis of current capabilities across the division reveals very limited time allotted and few skill sets to support communication work. Existing work is primarily focused on editing and producing a range of print publications.

Capacity for communications in IMD (as of 2015):

- 3 staff who consider science communication their primary duty in a full-time position.
- 16 additional staff who consider science communication a collateral or part-time duty (only 2 of which are permanent positions).
- Rarely are staff in a job series that the NPS would typically use for communication work.
- The above staff primarily focus on editing and proofreading print publications such as reports, briefs, and newsletters. Not all have extensive experience or training in skills such as: graphic design, graphic illustration, photograph manipulation, social media, video production, digital and website media, and interpretation/education.
- High-graded scientists are sometimes expected to perform professional communication duties such as formatting technical reports using professional-level templates and software. This expectation alone has caused some communication paralysis and the end results are of varying quality and success.

Skill sets needed to implement professional IMD communications include:

- Website management, writing, CMS integration, and content creation
- Graphic design, layout, and template use
- Photography and digital imagery
- Software expertise and product preparation for mainstream distribution
- Videography (pre- through post-production, distribution, and video project management)
- Science writing, editing, and copy-editing
- Writing for general audiences and storytelling using technical/scientific resources
- Interpretation and education coursework and experience
- Interactive media creation and design
- Social media use, content creation, and management
- Accessibility accommodation and design including Section 508 and Plain Writing Act compliance
- Project management
- Relationship-building expertise
- Public speaking
- Public affairs

Training Within Existing Positions

Providing training to existing employees not only increases the IMD's communication capacity, but also elevates the importance of communication work. Although there is variation in aptitude for communications work, all staff can benefit from training in communications in general, and science communications in particular.

The IMD Communication Strategy and Resource Guide outlines several trainings and action items (tactics) to improve baseline skill sets that are applicable to all employees. These include leadership and teamwork communication, public speaking, public affairs, and courses through the Alan Alda Center for Communicating Science.

Training for employees with communication duties and an aptitude for the work has also been recommended in tactics. This includes publication training, videography workshops, and interpretive writing. Through these trainings, existing staff will have an opportunity to develop skill sets to pursue specific communications duties or apply for a professional IMD communications position.

In addition to training and developing communications skill sets within the IMD, a core professional communication staff is needed for much of the workload. This staff should possess education, work experience, and training in communications fields.

Recruitment

Some specialized skills will need to be recruited, ideally in a position desirable to candidates (full-time, permanent). Short-term staff (interns, terms, seasonals, volunteers) can be considered for project-based work. Consistency, coordination, and supervision should be maintained by permanent staff.

Numerous staff currently working in the NPS possess the communication skill sets outlined in this Appendix as well as undergraduate, graduate, and work experience in scientific fields. It would be beneficial to recruit those individuals, in addition to training and recruiting within the IMD. Many good applicants will also be found outside the NPS.

IMD Communication Workload

The communications workload covered here includes those tasks that require professional skill and experience to execute. Therefore, many tactics outlined in Objectives A-D in the IMD Communication Strategy contribute to the workload assessment. Hour estimates were derived from consultation with staff who currently perform the duties; they should be used only as a reference as there is always considerable variance.

<u>Hourly Estimates</u>
Objective A (resource management audiences):
100=Each Network
400=Central Office
2,000=All IMD

Objective B (scientific audiences):
200=Each Network
540=Central Office
1,040=All IMD

Objective C (internal IMD and NRSS audiences):
0=Each Network
40=Central Office
90=All IMD

Objective D (public and interpretation audiences):
300=Each Network
250=Central Office
2,220=All IMD

Objective A-D:
600=Each Network (19,200 for 32 networks)
1,230=Central Office
5,350=All IMD (176,550* for 32 networks and central office, but using 88,275 for calculations)
90,105=Total hours for IMD

One staff work year is 2,000 hours (holidays are factored, but not annual and sick leave)
90,105 hours / 2,000 work year hours = **45 staff**

*This number is artificially high as not all networks and central office would need to conduct this work. Most of the "All IMD" work belongs into some combination of coordinated efforts of multiple networks and/or the central office. Therefore, an estimate of half seems more reasonable.

Finding the Balance

The IMD strives to find the balance between "network silos" and "centralization." Communication staffing should also strike this balance. Centralization has the benefit of cohesion, collaboration, and fewer staff numbers, but is weak in building relationships with field-based staff and being able to respond to immediate requests. Silos provide strong foundations for building relationships with networks and parks, the ability to adapt to unique situations, and provide quick responses. However, they can be weak in providing consistency to our audiences across the IMD and the NPS.

Appendix H: Workgroup Descriptions and Contacts

Multiple workgroups have been established within IMD and the results of their work have contributed to this strategy and resource guide. The current leaders and any produced report titles are listed below.

Science Communication Technical Advisory Group

Alice Wondrak Biel (Writer-Editor, Northern Colorado Plateau Network and Sonoran Desert Network)

Ted Gostomski (Science Writer/Biologist, Great Lakes Network)

Integrating Science into Management Workgroup

Robert Bennetts (Program Manager, Southern Plains Network)

Integrating Science and Park Management: *A Process for Developing Partnerships and a Shared Vision*

Stellar Science Workgroup

Dusty Perkins (Program Manager, Northern Colorado Plateau Network)

Excellent Science in the Inventory and Monitoring Program: *Guiding Principles and Recommendations*

Publications Workgroup

Andy Hubbard (Program Manager, Sonoran Desert Network)

IMD Publications: *Strengths, Challenges, and Recommendations*

Internal Communications Workgroup

Lisa Thomas (Program Manager, Southern Colorado Plateau Network)

[Formed in mid-2015; has not yet developed recommendations or products]

Appendix I: Contributors List

Contributions to this project came in many forms and from nearly every part of the country. The listed individuals may have provided in depth interviews, content development, or review comments. Many contributors brought insight from past experiences working in varied NPS directorates, divisions, offices, networks, and parks that are not reflected in their current position. Thank you, all.

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Margaret Beer | Communication Specialist, IMD Central Office
Robert Bennetts | Program Manager, Southern Plains Network
Katie Bliss | Training Specialist for Interpretation and Education, Mather Training Center
Michael Bozek | Regional Network Program Manager, Intermountain Region
Janel Brackin | Science Communications Lead, Mojave Desert Network
Karl Brown | Vegetation Mapping Program Manager, IMD Central Office
Cassity Bromley | Chief of Science and Resource Stewardship, Gulf Islands National Seashore
Peter Budde | Project Manager, IMD Central Office
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