



Spreading Ideas and Excellence

Crown of Thorns Starfish Wreak Havoc in American Samoa — The NPS Responds



Found throughout the Indo-Pacific, the crown of thorns starfish, *Acanthaster planci*, is one of the largest sea stars in the world, sporting multiple arms (up to 21) covered in poisonous spines. These unique features gave rise to this starfish's common name of the "crown of thorns". After climbing on a coral colony, the crown of thorns starfish extrudes its stomach out through its mouth then spreads it over the surface of the corals. The stomach secretes digestive enzymes that liquefy the coral tissue which is then absorbed. After this process, the coral colony is left devoid of living tissue and only the white skeletons of the colony remain. A single crown of thorns starfish can consume approximately 6-10 square meters of living reef per year. Low densities of *A. planci* naturally occur on reefs with little impact to the ecosystem. However, under certain conditions population explosions of these starfish can occur.

Unfortunately, the National Park of American Samoa (NPSA) is experiencing just such an outbreak. The park and the *Pacific Islands Network* (PACN) have been monitoring the coral community as a Vital Sign since 2007. By knowing which reefs have the crown of thorn's preferred food species (e.g., species from the genera *Acropora* and *Pocillopora*), park managers can better identify reef sites for culling and removal of this starfish (see photo). Geo-referenced maps of monitored reefs showing coral cover and species were rapidly provided by PACN to NPSA to help the park prioritize their efforts.

As of January 2014, NPSA Marine Ecologist, Dr. Tim Clark, has estimated that 6,433 crown of thorns starfish have already been removed from several sites. But there is much work left to do. This is an excellent example of employing long-term monitoring data to inform efficient management action for one of our most precious natural resources. —Dr. Sheila A. McKenna, NPS Marine Ecologist (PACN)

For more visit these postings on Pacific Island Parks blog: (<http://pacificislandparks.com/2014/01/10/corallivore/>) and (<http://pacificislandparks.com/2013/12/17/national-park-protects-coral-reefs-from-destructive-crown-of-thorns-starfish/>)#

For a short video on coral reef monitoring in the Pacific islands visit: (http://www.youtube.com/watch?v=rx_sfNZC-W8&list=TLN-w1CbBNRwnyzoHJE5ug5KcfNU6W8UPR)



Sodium bisulfate is injected into the destructive starfish to cull them. The chemical is harmless to the surrounding reef ecosystem, but deadly to the corallivore.

Whitebark pine monitoring by the Greater Yellowstone Network

The *Greater Yellowstone Network* (GRYN) has been monitoring whitebark pines as part of the inter-agency Whitebark Pine Management Strategy for the Greater Yellowstone Ecosystem (GYE). In the GYE whitebark pine (*Pinus albicaulis*) are an iconic symbol of high elevations and are often referred to as a keystone species. Its survival is threatened by climate change, wildland fire, and forest diseases and insects such as white pine blister rust (*Cronartium ribicola*) and mountain pine beetle (*Dendroctonus ponderosae*). Monitoring began in 2004 at a perfect time to measure the impact to whitebark pines during the recent mountain pine beetle epidemic that spread across the west over the past decade.

Analysis of tree mortality since 2004 indicates estimates of the cumulative proportion of dead whitebark pine >1.4 m tall to be 27% for the GYE. Of these, some trees died with indicators of fire, blister rust, and other mechanical damage, but most of the mortality occurred in larger diameter trees that were more susceptible to mountain pine beetle attack. Interestingly, there has been no significant change in rates of blister rust infection, since the start of the monitoring program, with around 20-30% of whitebark pines in the GYE being infected.

Monitoring results provide useful information to forest and park managers responsible for protecting this species. In 2011, as a result of the loss of mature, overstory whitebark pine across its range, the U.S. Fish and Wildlife Service listed whitebark pine trees as warranted for listing, but precluded under the Endangered and Threatened Species Act. Results and data from this monitoring program are being used in on-going USFWS listing evaluations and numerous research efforts. For example the results were cited in a food synthesis document for the Yellowstone grizzly bear population prepared by the Interagency Grizzly Bear Study Team. This food synthesis document addressed the response of grizzly bears to whitebark pine decline and changes in other food sources across the GYE. The USFWS is using the findings from this food synthesis document among other information to determine whether or not to proceed with a delisting proposal for the grizzly bear.

The continued monitoring of whitebark pine by the GRYN will be able to provide information on the health and state of the larger whitebark pine while

tracking the recruitment of smaller trees into cone producing trees. All of this information together is valuable for understanding and managing this important species into the future with threats from disease, insects, fire, and a changing climate. To learn more about this effort visit the GRYN website at <http://science.nature.nps.gov/im/units/gryn/monitor/>



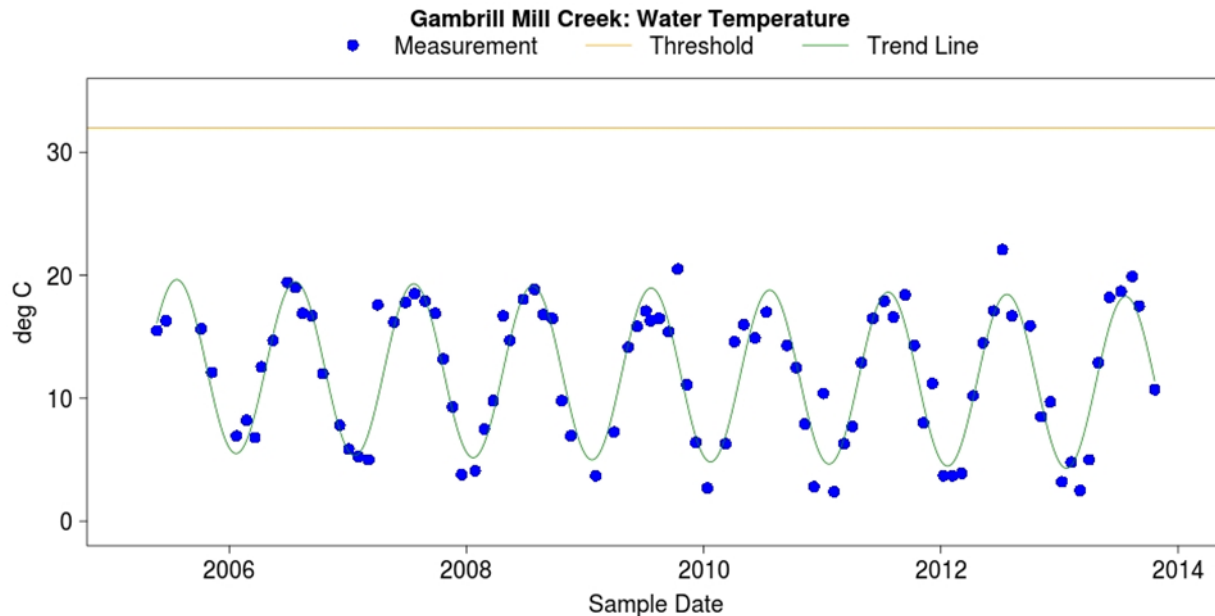
Plants Gone Digital!

The *Northern Great Plains Network* is very excited to announce the release of the Rocky Mountain Region Digital Herbarium. Developed and hosted by the University of Wyoming Libraries, the digital herbarium is a collection of high-resolution vascular plant specimen images and record label information available through an online search interface. The digital herbarium includes records from existing herbarium collections from Devils Tower National Monument, Fort Laramie National Historic Site, Jewel Cave National Monument, Mount Rushmore National Memorial, Wind Cave National Park, and several other Rocky Mountain Region parks are included in the collection. These collections can provide valuable information about current and historical park flora and are now easily discoverable for research, education, and conservation. Access the digital herbarium at <https://www-lib.uwyo.edu/digitalherbaria/index.php>

NCRN Online Water Quality Visualizer

The *National Capital Region Network* (NCRN) recently released an online interactive tool for viewing water monitoring data: the Water Quality Visualizer. Users can download NCRN water quality data from 2005-2013 (or any smaller time interval) as raw data or as a graph.

Users first select their NCRN park and monitored stream of interest, followed by one of the following water quality parameters: ANC, dissolved oxygen (mg/L), dissolved oxygen (%), pH, specific conductance, water temperature, total nitrate, or total phosphorus.



NCRN's Water Quality Visualizer produces graphics such as this graph of water temperature in Monocacy National Battlefield's Gambrill Mill Creek.

Graphics can be customized to show thresholds, seasonal patterns, and trends and can be downloaded in web (.png) or print (.jpeg) formats. For those with specific needs, numerous graphics options including font, point, and line changes are also available.

Project information and citations and references can be found on separate tabs within the visualizer.

You can go straight to the visualizer here: http://science.nature.nps.gov/im/units/ncrn/monitor/water_quality/visualizer.cfm Note that this works better in Chrome (or any other browser) than Internet Explorer (IE), because NPS is 3 or 4 versions behind on IE. Current versions of IE work just fine.

NCRN monitors 37 freshwater streams (wadeable, 1st to 4th order) in 10 capital region parks. Data collection on a wide suite of water quality parameters is ongoing since 2005. For more on NCRN water monitoring, visit http://science.nature.nps.gov/im/units/ncrn/monitor/water_quality/index.cfm



NCRN Hydrologic Technician Tonya Watts takes flow measurements during water quality monitoring at Monocacy National Battlefield. NPS Photo.

Forest Monitoring: An Example of Collab-

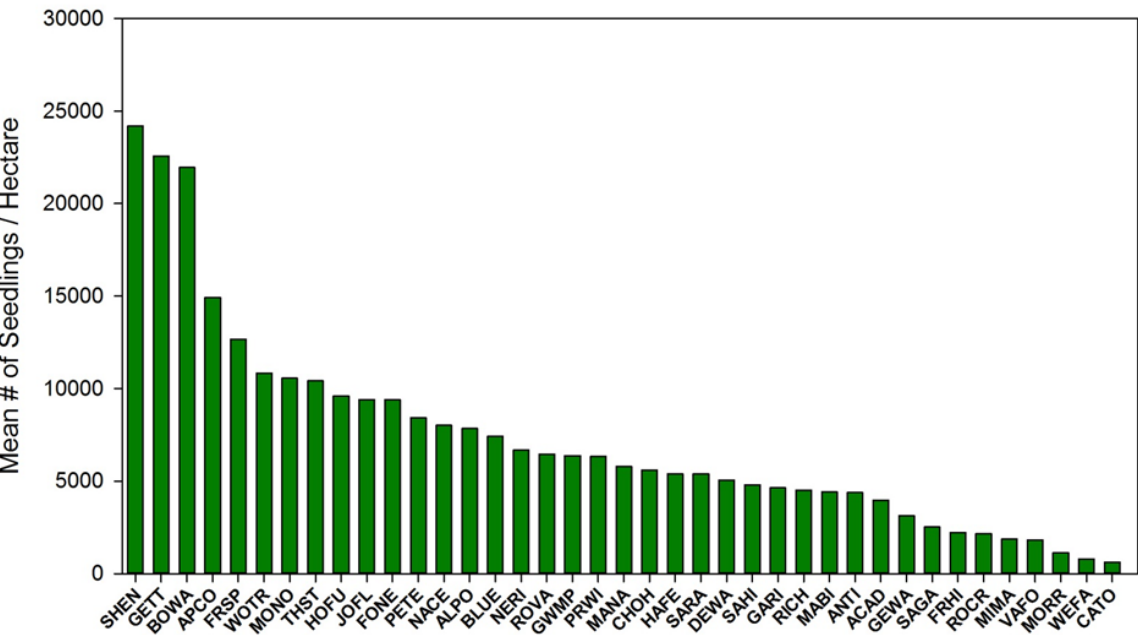
Over the past seven years, networks have implemented comparable protocols to monitor more than 2,000 forest vegetation plots in 61 parks in four NPS regions. The forest monitoring collaboration includes *Appalachian Highlands, Cumberland Piedmont, Eastern Rivers and Mountains, Great Lakes, Mid-Atlantic, National Capital Region, Northeast Coastal and Barrier, and Northeast Temperate* networks, as well as three prototype parks.

Data from the forest vegetation monitoring are already proving valuable to network parks. Many Northeast Region parks are dealing with increasing pressure from White-tailed deer. Data on density and composition of seedling and sapling regeneration feed directly into park management. Where deer management is currently being implemented, such as in Valley Forge NHP, Gettysburg NMP, and Catoctin MP, changes in regeneration over time is helping the parks calibrate their deer management to meet the goal of maintaining deer densities that allow for sustainable forest regeneration. Likewise, in parks concerned by increasing deer densities, regeneration data are used to define trigger points for management action. Some of the parks with the highest regeneration levels are those that have been managing deer management for over a decade, for example at GETT, while at the other end of the scale we are starting to see recovery of forests as management is implemented.



Jesse Wheeler and Camilla Seirup monitor seedling regeneration at Fredericksburg and Spotsylvania NMP, Virginia.

Over the past 7 years, 3 Northeast Region networks shared a forest vegetation monitoring protocol and field crew to sample over 650 plots in 26 parks from Acadia NP in Maine to Colonial NHP in Virginia. Such a collaborative approach has resulted in a cost effective method for sampling our parks, especially for networks that have a limited budget. In addition, the collaboration has allowed us to hire high-level field crew members attracted by the opportunity to sample such a wide range of parks in the Northeast Region. As we face the challenge of funding cuts into the future, we will



be looking for other protocols that can share resources to ensure the long-term security and stability of our monitoring programs.

Regeneration varies substantially across the eastern U.S. At Catoctin MP (CATO) and Valley Forge NHP (VAFO), where deer densities have reached as high as 241 deer / mi², regeneration levels are extremely low; both parks now have deer management plans. At Gettysburg NMP (GETT) deer densities reached as high as 381 deer / mi² prior to management implementation in 1995; GETT now boasts among the highest regeneration level among parks monitored.

APHN monitoring of plant poaching at BLRI assists law enforcement rangers with appre-

An uncommon, large-leaved genetic form of galax (*Galax urceolata*), an evergreen plant endemic to the southern Blue Ridge Mountains, is the object of commercial-scale poaching, particularly at the Blue Ridge Parkway. An estimated 3 billion plants are harvested from the wild each year to supply a multi-billion dollar market for this plant (which is used in floral arrangements), both in the United States and abroad. Monitoring information obtained by Appalachian Highlands Network field crews has made it possible for rangers to be in the right place, at the right time, and over 85 poachers have been apprehended since the *Appalachian Highlands Network* monitoring program began. Up-to-date, site-specific information on ongoing poaching activity assists rangers with planning and optimizing their enforcement efforts, which is essential for BLRI, the most-visited unit in the National Park system, where demands on law enforcement staff are relentlessly high. For more information contact Nora Murdock at 828-407-5656 or nora_murdock@nps.gov.



A duffle bag containing thousands of galax plants, confiscated from poachers by BLRI rangers.

2014 Golden Gate Parks BioBlitz and iNaturalist

Simon Kingston helped lead data management for the annual NPS/National Geographic BioBlitz on March 28 and 29, which is being held at Golden Gate National Parks in the San Francisco Bay Area. They used the online observation recording tool iNaturalist (www.inaturalist.org), which also supports iOS and Android mobile apps, as the data repository this year, rather than a custom stand-alone database. iNaturalist shows great promise as a tool that could work in conjunction with NPSpecies. In the upcoming months we will be asking your opinions on it, and we will be prototyping its use in several parks. Contact: Simon Kingston

Data Visualization

Brent Frakes and Simon Kingston have been working on a process to assess what networks need for data visualization tools. A series of moderated webinars is scheduled, and networks have been invited to sign up for 15-minute time slots to present visualization solutions, ideas, and needs.

The dates for the webinars are below, although if there is substantial interest we will add additional dates:

Tuesday April 22 @ 11:00 MDT (<https://www1.gotomeeting.com/register/736722640>)

Wednesday April 23 @ 11:00 MDT (<https://www1.gotomeeting.com/register/859385049>)

Tuesday April 29 @ 11:00 MDT (<https://www1.gotomeeting.com/register/480301224>)

Wednesday April 30 @ 11:00 MDT (<https://www1.gotomeeting.com/register/762734616>)

If you want to present something, fill in the following Google Form (https://docs.google.com/forms/d/1UhWt1Na4qHsV_gN6YQSJI8h9z06LLaKajJ3tonj8Tyw/viewform)

Once you have filled in the form, we will follow up to confirm the date and topic.

For more information, you can view a recorded webinar giving an overview of the project: http://sharenrss/im/webinars/Recorded_Webinars/2014-03-05%20I_M%20Data%20Visualization%20Needs.wmv

Contact: Brent Frakes or Simon Kingston

How do you estimate the number of cave crickets when you don't even know the area of the target population?

Cave crickets are an important source of nutrients and energy into caves, so their abundances are an important vital sign. They forage aboveground most nights, and during the day they roost on the walls and ceiling of cave passages near entrances from the surface. Those surfaces include unknown area, as both height and width vary along passages. Even if the area could be measured, it cannot be mapped to a rectangular grid of equal-area quadrats, as used in most sampling designs. Also, crickets tend to aggregate into clusters. Tom developed a sampling design based on a baseline run down the center of passages and 10cm wide strips perpendicular to that baseline as the sample frame. A sample of strips was obtained from a finite, one-dimensional GRTS draw. If a cricket was detected in a sampled strip, all nearby crickets were recursively added to the sample so that the entire cluster was counted. This is an application of strip adaptive cluster sampling. This design is relatively efficient, and provides unbiased estimates of the total number of crickets (but not their density). Contact Tom Phillipi

Oiled otters were one of many marine species affected by the disaster.

Guidelines for protocols and SOPs

The former stand-alone protocol database is now fully integrated into the Data Store, and you can search for and download protocols via a link on the IRMA home page: <https://irma.nps.gov/App/ProtocolTracking>. It is a straightforward process to have your protocols discoverable in Protocol Tracking; guidelines are forthcoming. Alison Loar will be contacting many networks to double-check that no protocols are missing from the Protocol Tracking reports. Also, in development are specific workforms in the Data Store for the long-term management of protocols, SOPs, and all their associated versions, which we hope will be this summer. Contact: Margaret Beer



Exxon Valdez 25th Anniversary March 24

Twenty-five years ago, the Exxon Valdez spilled 11 million gallons of North Slope crude oil into Prince William Sound. This oiled sea otter was one of many affected by the disaster—an estimated 2,800 died outright from the spill. Tens of thousands of sea ducks and many other animals died from this disaster. Since 2006, the Southwest Alaska Network has monitored various parts of the nearshore ecosystem including sea otters along the coast of Katmai and Kenai Fjords National Parks. The sea otter population in Katmai National Park (estimated at 8,644 individuals) continues to grow while in Kenai Fjords National Park it (estimated at 1,322 individuals) appears to be stable. Even though sea otters appear to be recovering in these areas, oil (and its effects) still remains in the affected area. To learn more about sea otters and other NPS marine nearshore monitoring efforts, visit <https://science.nature.nps.gov/im/units/swan/publications.cfm> and check out this video of how we monitor the intertidal area of southwest Alaska parks <http://bit.ly/1gdTIWY>.

Natural Resource Publication Series

[Section 508 of the Rehabilitation Act](#) (Section 508) of the Americans with Disabilities Act requires us to present all web pages and published reports in formats that comply with established regulations and standards. We hope to meet these standards for all reports published in the series and posted as PDFs after May 1, 2014. Fagan Johnson has updated report templates for MS Word and InDesign. These updates incorporate several changes that ensure a smooth conversion to PDF and that minimize the work Fagan or your science communication staff needs to do to ensure 508 compliance. Please make sure you are using the most current templates for reports you are submitting in the series. They are available at <http://science.nature.nps.gov/>

Introducing...Marianne Tucker

IMD Program Manager Marianne Tucker has been with NRSS since 2001. Within IMD she supervises three federal staff members and manages the MBS contract of professional software developers. She directs IT/data management work assignments among federal-contractor teams who work on national applications (IRMA, NPSpecies, NPSCAPE, PUPS, RPRS, STAR, etc.) as well as a variety of network database requests. As Program Manager, she works closely with the Chief and Deputy Chief in key administrative operations of budget, staffing, contracting, planning and accomplishment reporting. Marianne and Lisa Garret are co-leads for the Achievement and Accountability work group.



Marianne has a B.S. in Computer Information Systems and a M.S in Soil Science from University of Missouri, Columbia. After graduate school Marianne worked at a coal mine in northern Missouri reclaiming strip-mined land. When the mine closed in 1993 she took the opportunity to move to Colorado and began working as a contractor for USFWS and USGS where her co-workers were Lisa Nelson and Derrick Dardano. She led a two-year project migrating the threatened and endangered species list from one USFWS individual's personal computer to a web-enabled application called TESS. Marianne was hired as a database administrator for the NRSS IT group and moved to the Inventory and Monitoring Division in 2008.

Data Managers Meeting

31 data managers from networks across the country attended Data Management Training in Fort Collins the week of April 7. Sessions included hands-on work focusing on SQL Server Reporting Services and GIS, rapid-fire presentations, and discussions on topics such as Protocol and SOP management, NRDT improvements, and the new Data Store interface. Materials and presentations are posted on the DM Training SharePoint document library: http://sharenrss/im/networks/2014_DM_Training/Forms/AllItems.aspx

Data manger
meeting photo
coming soon!

I&M Workgroup Report Out

Four workgroups were established to respond to issues raised the I&M survey and other I&M priorities. Each workgroup consists of staff from networks, regions, and the support office. Progress from the workgroups follows:

A nine member **Inventories** Work Group (IMIWG) has been established to develop recommendations for NRSS leadership. It will include strategies for completing the Basic Twelve Inventories, and will address what should come next after their completion. Working with inventory coordinators and parks through I&M networks, the team will write a strategy document that identifies several alternatives for completing the remaining inventories within the next five years. They will also develop recommendations for how I&M might proceed with regard to inventories once the basic twelve are complete. To date, the IMIWG has met twice. They have drafted a project road map and are working on summarizing the current status of ongoing and remaining vegetation, geology, and soils inventories.

The **Excellence in Science Committee** consists of three workgroups: 1) Stellar Science in the National Park Service is chaired by Dusty Perkins (NCPN) to develop ways to maintain or increase science quality in NPS I&M, Integrating Science into Parks is chaired by Robert Bennetts (SOPN) focuses on ways to incorporate monitoring results into management, and Developing Excellent Scientists is chaired by Joe DeVivo (SECN). Each workgroup is tasked with developing, implementing, and evaluating the success of a plan containing: 1) specific recommendations for achieving the stated goals identi-

fied within that workgroup and 2) measures to evaluate the success of the plan. Once approved, the plan will be signed by the I&M Chief and the workgroups will then be responsible for implementation of the plan and the evaluation of its success.

The purpose of the **Achievement and Accountability Workgroup** (AAW) is to develop criteria to evaluate the effectiveness and provide accountability for networks and the support office. Once this is done, the criteria elements will be incorporated into appropriate evaluation documents including EPAPs, annual administrative reports and annual work plans. The initial focus is on networks but inventories, regions, and support office will follow suit. AAW criteria and procedures will be approved by the IMD Chief and the I&M Leadership team. The goal is to have the criteria defined and incorporated into evaluation reviews by August. During the last three meetings, the group developed evaluation categories that include safety, fiscal responsibility, inventory, monitor, publications, science communication/science integration, and data management.

The **Communication** workgroup is tasked with developing a communications plan for IMD. The plan will include sections for Science Communication to resource managers/ scientific community and for education and outreach to the public in addition to addressing communication within the I&M program. Three subgroups have been established for each of these functions. We're working to bring on a communications specialist to assist in the development of the plan via a detail.



Announcements

The results of the FY14 request for proposals for the US geological Survey National Park Monitoring Project have been released. This partnership supports USGS research on priority topics identified in collaboration with the National Park Service (NPS) Inventory and Monitoring Program. A list of funded projects is located http://science.nature.nps.gov/im/monitor/USGS_NPMP/funded_abstracts14.cfm.

Welcome:

Michael DeBacker began his 120-day detail as IMD Chief on April 8.

Sarah Wakamiya is the new data manager for SFAN. Sarah was previously with NGPN and MIDN.

Allison Snyder, SCPN data manager, has accepted the data manager position at KLMN. She will be transitioning in early June.

Data manager positions are still vacant at UCBN and MOJN. Simon Kingston has been helping MOJN bridge the gap between data managers (since Bob Truitt's retirement), which is giving him a chance to spend several weeks on-site at a network.

Lisa Cowart has been selected as the SECN's new coastal ecologist. She comes to NPS from the Joseph W. Jones Ecological Research Center where she's been the lead aquatic ecology research technician. Prior to that she worked with North Carolina Division of Coastal Management and NOAA on coastal shoreline change and salt marsh monitoring projects. Lisa will be duty stationed in Athens, GA beginning May 19th.

The SECN recently hired **Pete Mocus** as the network's new coastal technician who came to NPS from USGS in Jamestown, ND. Pete will be working primarily on the network's salt marsh and coastal shoreline monitoring protocols, but before then we're giving him the firehose treatment on our water quality monitoring protocols since he'll also be assisting with those vital signs while we try to fill other vacancies.

Vacancy Announcements:

Great Lakes Network, Aquatic Ecologist—GS-7/9 STF. Vacancy announcement expected to be open in early or mid-May. The position will be stationed in Ashland, WI and will be in charge of running the large rivers water quality program and



helping with amphibian monitoring. Contact Bill Route at 715.682.0631 x 221 for more information.

Detail Opportunities:

Mid-Atlantic Network Program Manager—120-day detail or temporary promotion as GS-12/13, located in Fredericksburg VA. It is advertised at: <https://sites.google.com/a/nps.gov/nerdetail/>. Contact Jim Comiskey for details.

The **Klamath Network Program Manager** will be vacated as of April 26, 2014. We will be announcing a GS-12/13 interdisciplinary 60-120 day detail or temporary promotion for this position soon. It will be duty-stationed in Ashland, OR on the Southern Oregon University campus. Contact Penny Latham at 206-220-4267.

