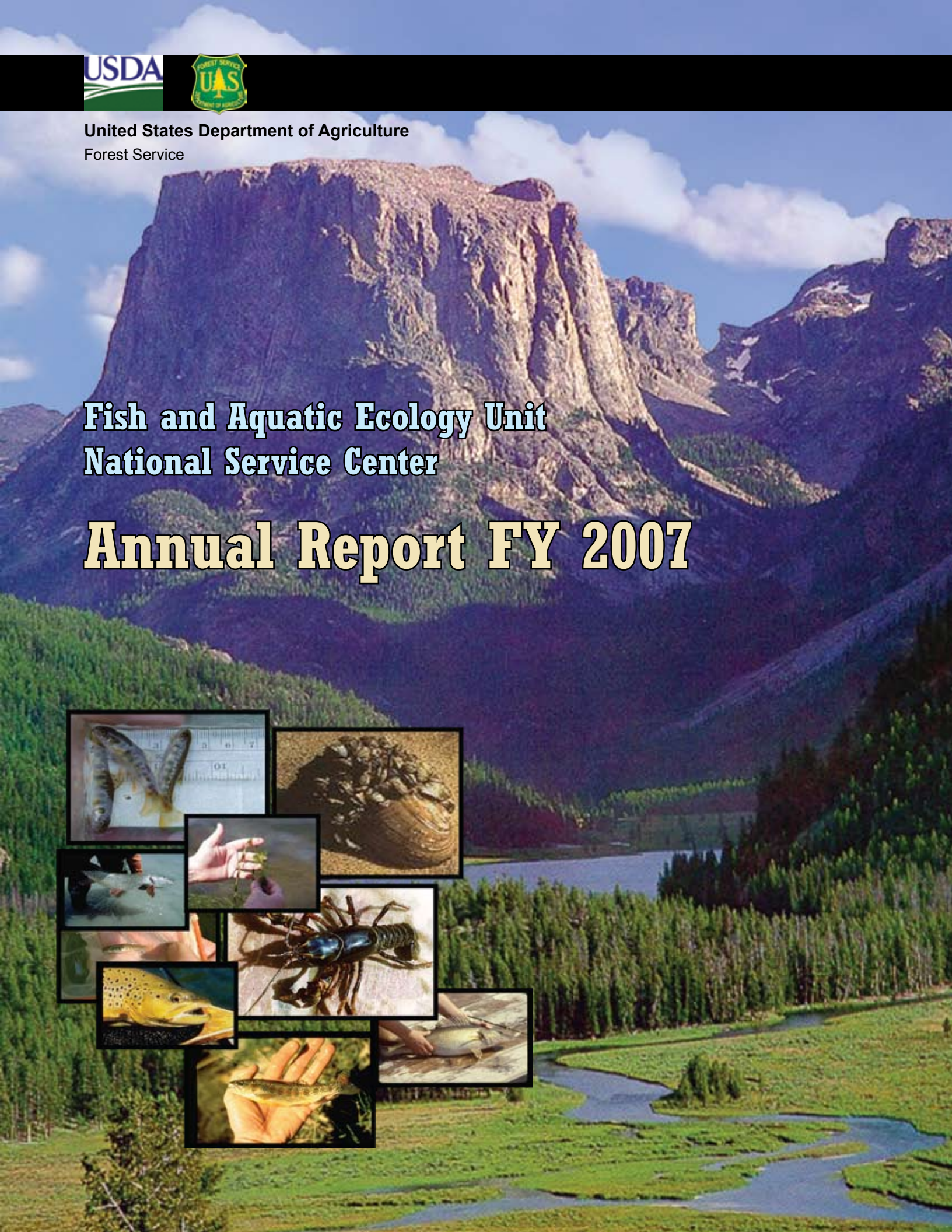

United States Department of Agriculture
Forest Service

Fish and Aquatic Ecology Unit
National Service Center

Annual Report FY 2007

Cover Photo: Studies in wilderness areas and reference reaches help define the range of natural variability for many parameters. Field biologists use this data in effectiveness monitoring of managed watersheds.

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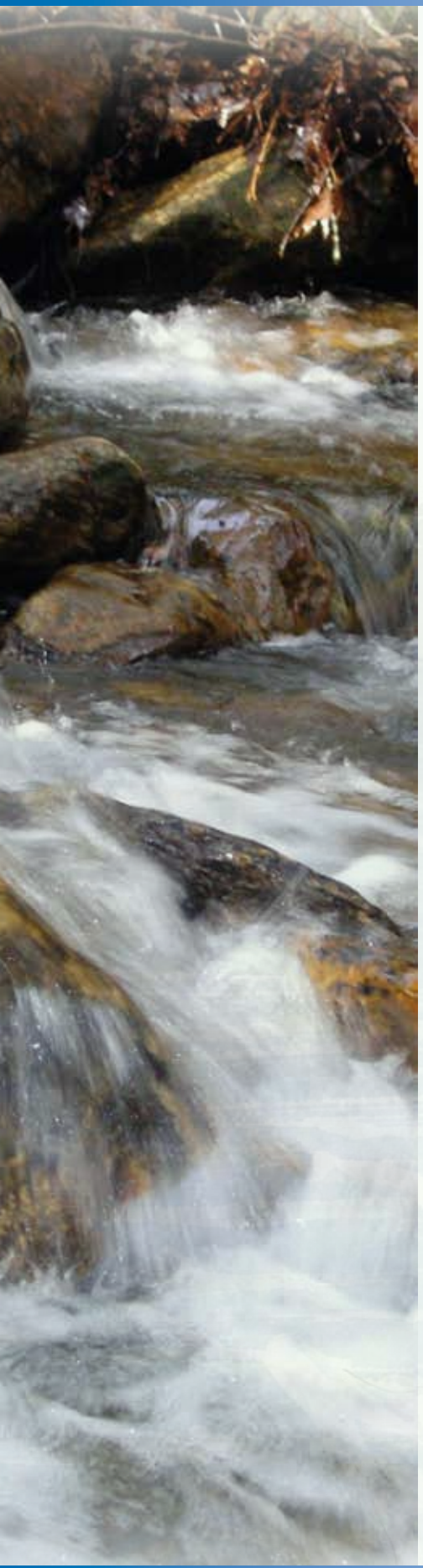
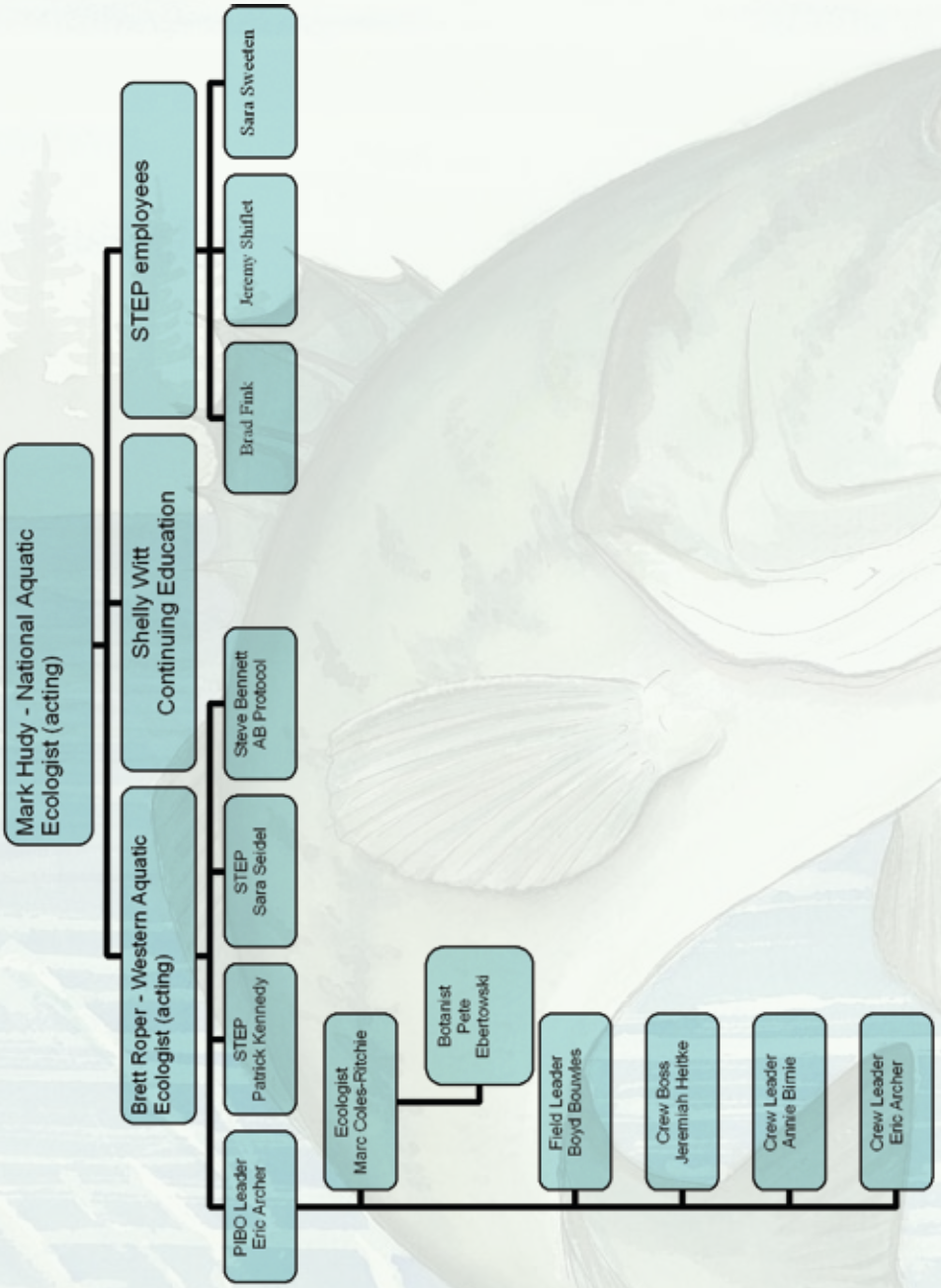


Fish and Aquatic Ecology Unit – Organizational Chart



Fish and Aquatic Ecology Unit – National Service Center

Mission: The mission of the U.S.D.A. Forest Service Fish and Aquatic Ecology Unit is to identify emerging aquatic resource issues, develop technology to help address these issues, and transfer this technology to field biologists.

Vision: The Fish and Aquatic Ecology Unit will provide scientifically sound, cost-effective technologies to aquatic resource specialists in support of the conservation and restoration of aquatic communities on Forest Service land.

What We Do: The Fish and Aquatic Ecology Unit works with federal and state research organizations and universities to develop technology to address emerging resource issues. Once this technology is developed we disseminate this technology to Forest Service aquatic resource specialists through, continuing education workshops, presentations, publications, and on-site visits. In addition the Unit currently supervises for Region 1, 4 and 6 the effectiveness monitoring project for PACFISH and INFISH (PIBO).

Our Business Model: The Fish and Aquatic Ecology Unit's business model over the last eighteen years is to maintain flexibility to meet the ever-changing needs on the ground. The Unit is co-located with Utah State University (West) and James Madison University (East) to take advantage of partnership opportunities on new and emerging natural resource issues that may not be available with internal partners. The University setting allows us to be co-located with statisticians, geo-morphologists, soils scientists, geographers, conservation biologists, watershed scientists, fish and wildlife biologists, etc. all at one location. Many times we leverage existing funding by using graduate students and undergraduate students to help accomplish our program of work. By using graduate students and challenge cost shares with Universities we often can complete projects at greatly reduced costs. Many of the students are current Forest Service employees looking for career advancement opportunities that a graduate degree can provide. These students conduct studies on their home National Forest unit for advanced degrees and after graduating go on to work with the agency.

The FAEU currently supervises and provides technical guidance for the effectiveness monitoring project PACFISH and INFISH (PIBO) in regions 1, 4, and 6.

Steering Committee: (effective September 24, 2007)

Harv Forsgren, Regional Forester
Ron Dunlap, Assistant Director
Cindy Swanson, Regional Director
Dave Schmid, National Fisheries Program Leader
Bill Lorenz, Line officer
Nick Schmal, Regional Fisheries Program Leader

Website: http://www.fs.fed.us/biology/fishecology/

Personnel

Mark Hudy is the acting National Aquatic Ecologist. He is stationed at James Madison University in Harrisonburg, VA. Previously, Mark was the National Aquatic Ecologist – East and National Fisheries Program Leader for the USDA Forest Service. Additional experience includes forest fisheries biologist positions for George Washington National Forest, Jefferson National Forest and the Francis Marion and Sumter National Forest. In addition Mark has worked for the state of Arkansas (Statewide Trout Biologist). Mark earned his B.S. in fisheries and wildlife from Virginia Polytechnic Institute and State University, Blacksburg, in 1978 and his M.S. in fisheries from Utah State University, Logan, in 1980.

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Brett Roper, Ph.D., joined the Forest Service Fish and Aquatic Ecology Unit in 2000 as an Aquatic Ecologist and serves as the Program Leader for the Aquatic Monitoring Project but is the acting primary contact with the unit work in the west. Brett's work included being a District Fisheries Biologist on the Umpqua National Forest and a Forest Fisheries Biologist on the Idaho Panhandle National Forests. He has also served details as a District Ranger (Bonners Ferry, ID), Regional Fisheries Biologist (Missoula, MT), and National Aquatic Ecologist. He earned his B.S. degree in environmental studies from Utah State University, Logan, in 1986, and his M.S. in forest resource management from Utah State University, Logan, in 1989. Brett completed his Ph.D. in fisheries management at the University of Idaho, Moscow, in 1995.

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Current and Recent Projects (2005-2007)

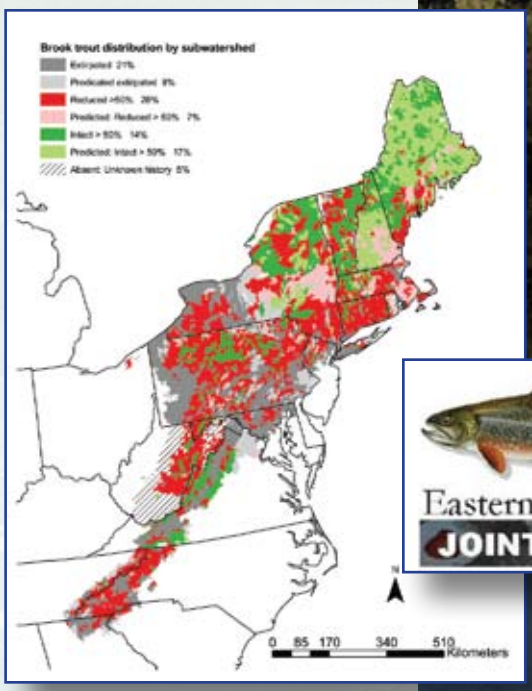
(See Table 1 for partnership information)

A review of stream habitat objectives and their use in setting standards for land management: This project reviews the current use of stream habitat attributes as management objectives, examines their usefulness in guiding land management practices, and suggests ways to make this concept more useful in light of new information on watershed disturbance and recovery. We are currently developing guidelines for how forests can adapt existing data. Application: All USDA Forest Service Lands; Unit Contact: Roper

Smith Creek Watershed Restoration: The restoration project is a National Fish Habitat Initiative demonstration project (Eastern Brook Trout Joint Venture) connecting national forest lands to downstream agricultural lands to ensure long-term viability of brook trout populations.
Application: Southern and Eastern Regions; Unit contact: Hudy

Risk assessment and predictive model for brook trout populations. The objective of this project is to develop a ranking system for prioritizing watersheds for brook trout protection, enhancement and restoration work. The ranking system will be used by the National Fish Habitat Initiative (Eastern Brook Trout Joint Venture) for evaluating project proposals. Application: Eastern and Southern Regions; Unit Contact: Hudy

Fish passage/ stream connectivity issues. The purpose of this project is to develop and validate coarse filters for families of non-game fishes where swimming performance information is not available. Biologists will use the filters for rapid assessment of culverts for fish passage capabilities.
Application: All USDA Forest Service Lands; Unit contact: Hudy



The unit has expertise in conducting and analyzing large-scale assessments such as the recently completed work on cutthroat trout sub-species and the assessment of brook trout for the Eastern Brook Trout Joint Venture.

Aquatic organism passage (AOP) has been a key focus area the last several years. Development of coarse filters as enabled forest biologists to quickly and effectively screen thousands of culverts for potential replacement.

Effects of hemlock wooly adelgid on riparian ecosystems: This is a long- term project monitoring large wood recruitment, water temperature, and fish response to the invasive hemlock wooly adelgid on National Forest lands. Application: Eastern and Southern Regions; Unit contact: Hudy

Understanding the invasion ecology of exotics (in this case brook trout in Idaho) are critical to biologists managing for native fishes. USDA Forest Service lands are critical core areas for the future existence of many native fishes.

Comparison of methods using macroinvertebrates to evaluate watershed status: This project is designed to compare a variety of multimetric and multivariate approaches commonly used when using macroinvertebrates to quantify stream health. The primary goal of these comparisons is to provide a variety of tools to Forests so that they can combine macroinvertebrate data with GIS and site information. Application: All USDA Forest Service Lands Unit contact: Roper

Using Geographical Information Systems to evaluate the relationship between disturbance and stream condition within the Frank Church Wilderness Area: In cooperation with the Remote Sensing Applications Center in Salt Lake City, we plan to use GIS coverages to correlate landscape disturbance over the past 30 years with stream conditions evaluated at a site. We expect this study to reinforce the need for actual on site data collection. Application: All USDA Forest Service Lands; Unit Contact: Roper

Aquatic Ecological Technical Manual: The goal of our National Team is to standardize stream evaluation methods. In 2003 we finalized the core aquatic attributes and sampling designs for use in the evaluation of status and trends of aquatic resources on lands managed by the Forest Service. We are currently editing this manual based on peer reviews. We plan to finalize the manual in 2008. Application: All USDA Forest Service Lands
Unit Contact: Roper

Aquatic Biota Technical Guide
The goal of this technical guide is to build on the AEUI and standardize methods used to evaluate the presence, distributions, and density of aquatic biota across lands managed by the USDA Forest Service. The draft Aquatic Biota Technical Guide will be completed at the end on 2007. Test the protocols will begin the following year. Application: All USDA Forest Service Lands; Unit Contact: Roper

Migration of fluvial cutthroat within the Coeur d'Alene basin: We are working to better understand the movement patterns of fluvial cutthroat trout within the Coeur d'Alene National Forest. We have completed the tracking phase of this project. We are now analyzing the movement patterns of cutthroat trout within separate watersheds in the basin and relating movement to basin and habitat conditions. Application: Region 1; Unit Contact: Roper

State and Federal standardization of stream survey protocols: Over the last several years the Unit has worked with the Federal (PACFISH/INFISH Effectiveness Monitoring Team, Aquatic Effectiveness Monitoring Program, Environmental Protection Agency, and the Bonneville Power Administration) and State agencies (Washington, Oregon, and California) to find define criteria that would be used to define a good sampling protocol. In 2004 this process was formalized into the monitoring component of the Pacific Northwest Aquatic Monitoring Partnership (PNAMP). In 2005, we compared aquatic survey methods of nine different large-scale monitoring programs at 12 stream reaches within the John Day basin during the summer of 2005. Funds for the project have been provided by the National Marine Fisheries Service, Bureau of Land Management, Forest Service, and Bonneville Power Administration ($450,000 funding, all but 40,000 USFS). Application: All USDA Forest Service Lands. Unit Contact: Roper

Evaluating the effect of diversions on a unique mountain whitefish population. Many fish populations are affected by a myriad of diversions, which come on public and private land. This project seeks to quantify the magnitude and locations of these diversions as well as their overall population effects. Application: Region 1,2,3,4, and 6;
Unit Contact: Roper

Evaluating the repeatability of Rosgen Stream Typing. The Rosgen stream classification system is commonly used by Forest Service personnel to classify streams. In conjunction with the Rocky Mountain Research Station, we test the ability of multiple observers to arrive at the same class. We found that the method was not repeatable. Application: All USDA Forest Service Lands; Unit Contact: Roper

Monitoring the effect of restoration activities on the spawning, distribution, and populations of Bonneville Cutthroat trout. The projects seek to quantify cutthroat populations within the Logan River and then relate these findings with current restoration efforts in the basin. Application: All USDA Forest Service Lands; Unit Contact: Region 4

Improving and monitoring restoration techniques and practices are strength of the FAEU. Internal and external partners regularly consult with the FAEU on restoration projects.

Using stream characteristics in order to better understand sediment in streams: Currently sediment is a measured stream attribute, which is often difficult to interpret. The goal of this project is to provide site-specific predictions of sediment size in the absence of disturbance by explaining attributes which better predict sediment sizes in streams. This analysis should help the Forest Service better utilized their sediment data. Application: All USDA Forest Service Lands; Unit Contact: Roper

Use of stream survey data for Forest planning efforts: The Unit has worked with fish biologists, hydrologists, and geologists from several National Forests in both Oregon and Washington on a design using stream survey

The development of land use metrics at various scales has been useful in predicting the status of aquatic life. Risk assessments from these metrics have helped biologist set priorities for protection, restoration and enhancement of important fisheries.

data to evaluate the current condition of streams. Together we have formulated a method that uses geological subsections as strata for analysis.
Application: Region 6; Unit Contact: Roper

Instruction and teaching helpful to the professional development of fisheries biologists and hydrologists: We teach a variety of Forest Service monitoring courses on how to design and conduct monitoring programs. We usually teach one to three classes a year with Class size averaged 20 students.
Application: All USDA Forest Service Lands
Unit Contact: Roper

Develop Recommend reading lists. We review numerous relevant publications related to fire and aquatic ecosystems, and then produce a recommended reading list retrievable on our web site. Application: All USDA Forest Service Lands; Unit Contact: Roper

Historical distribution and taxonomy of freshwater mollusks of the western United States: The project produced distributional database for GIS coverage of western freshwater mollusk species and their historical distributions. This database will allow managers and researchers to anticipate local mollusk occurrences, identify areas for further inventory and long-term monitoring. The database will be available on the Unit website in the future.
Application: Regions 1,2,3,4,5,6,10; Unit Contact: Roper

Yellowstone and Snake River cutthroat trout distribution in the Snake River headwaters of Wyoming. The goal of this project is to document the geographic distributions of Yellowstone cutthroat trout and Snake River cutthroat trout in the Snake River headwaters of Wyoming. These inventories and mapping will definitively display the present distributions of cutthroat trout, document current distributions of all game and non-game fishes in surveyed streams, and identify resident versus migratory populations of cutthroat trout in the upper Yellowstone River drainage. Application: Regions 2 and 4; Unit Contact: Roper

Morphological, ecological, and genetic characteristics of cutthroat trout populations in the Snake River headwaters of Wyoming: Laboratory analyses were conducted to assess genetic structuring between Yellowstone cutthroat and finespotted Snake River cutthroat trout. Optimization of 12 micro satellite loci was completed for further investigations of historical geologic and hydrologic conditions that may explain the patterns of genetic variability observed in cutthroat trout in the Snake River headwaters. The data have led to the questioning of why there are two subspecies rather than one. Application: Regions 2 and 4;
Unit Contact: Roper

Brook trout invasion ecology: FY 2007 was the sixth year investigating brook trout invasion ecology in the Lost Rivers of southeast Idaho. In 2006 the sampling effort evaluated the growth rate of brook trout in different locations. Our data indicates that growth and survival rates are much higher

for allopatric populations of brook trout than they are for brook trout sympatric with bull trout in Mill Creek. Application: All USDA Forest Service Lands; Unit Contact: Roper

Evaluating cutthroat trout population status within the Teton Valley: Our goal in this study is to identify which of a variety of threats are reducing populations. Those threats include competition with introduced species, whirling disease, degraded habitat, diversion, and lack of connectivity. To date, we have used trapping data to both gain a better understanding of juvenile and sub-adult movements and to document the natural range of variation within the system. These baseline data will be very important in the ultimate evaluation of population recovery in the Thomas Fork following restoration activities. This study will help to quantify the benefits of restoration work and will provide managers with useful information about the migration patterns of fishes in the Bear River and it tributaries. Application: Region 4; Unit Contact: Roper

Integrating remote sensing applications into broad-scale aquatic/riparian resource monitoring in the Columbia basin. There is a critical need to understand the trajectory of aquatic and riparian resource conditions in the Columbia basin where listed threatened and endangered species occur. Currently, Regions 1, 4, and 6 of the Forest Service and the BLM state offices in Idaho and Oregon are conducting field-level monitoring to determine habitat condition. This sampling is conducted at the site level (200m) in HUC 6 watersheds. While comparisons are possible, it is often difficult to detect a change within watersheds because of the limited sampling unit. By using remotely sensed images to characterize some aspects of the riparian/aquatic condition and use field information to ground truth the imaging, we may be able to develop models to characterize "within" watershed condition. These models could assist field units with the identification of problem watersheds or watersheds that are a high priority for restoration. The use of remote sensing could provide a cost-effective means to characterize watershed condition. Application: All USDA Forest Service Lands;
Unit Contact: Roper

Conservation Strategy for cutthroat trout: The unit has played an important role in writing conservation strategies for Yellowstone, Snake River, and Bonneville cutthroat trout. Application: All Western USDA Forest Service Lands; Unit Contact: Roper

Best management practices (BMP's) for Wood Turtles: The wood turtle is a riparian dependant species that is on the sensitive species list in the Eastern and Southern Regions. Developing effective BMP's for this little studied turtle could prevent listing under the Endangered Species Act. The study documents seasonal home range and fidelity to in-stream winter hibernacula. Application: Eastern and Southern Regions; Unit Contact: Hudy

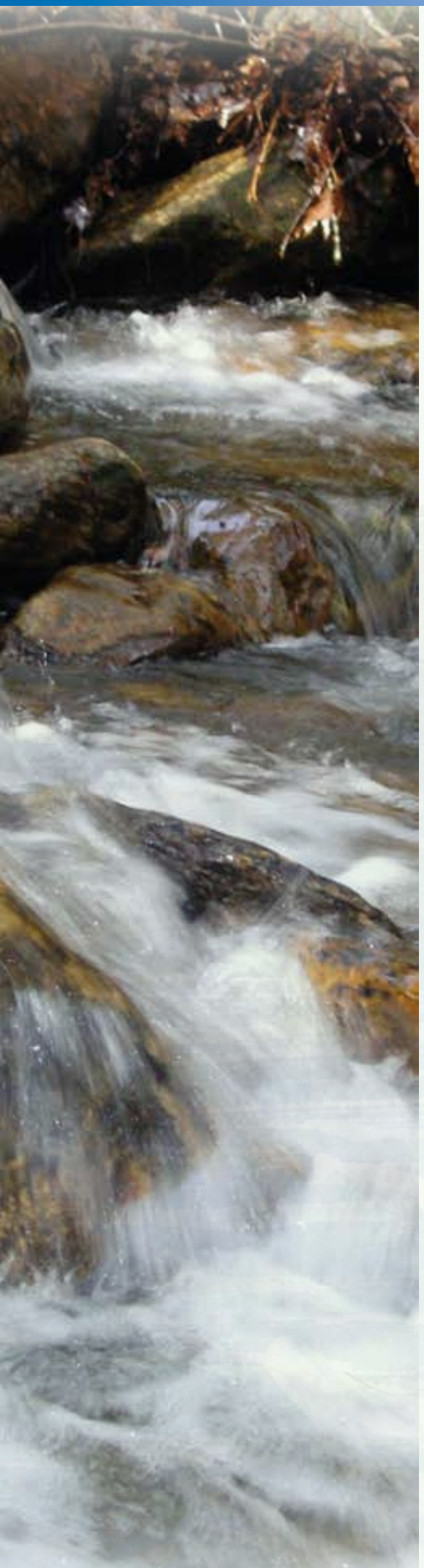
Partnerships (2005-2007)

Table 1. Partnership contributing dollars and/or in-kind match for the Fish and Aquatic Ecology Unit (2005-2007).

Partnerships and Collaborators 2005- 2007	$	In-Kind contributions
Eastern Brook Trout Joint Venture - Assessment		
U.S. Fish and Wildlife Service WO	X	X
Trout Unlimited Headquarters		X
International Association of Fish and Wildlife Agencies		X
United States National Park Service		X
United States Geological Service	X	
Conservation Management Institute		X
James Madison University- Department of Biology	X	
Virginia Tech – Department of Statistics		X
USDA Forest Service – Eastern Region		
Superior NF		X
White Mountain NF		X
Green Mountain NF		X
Allegheny NF		X
Monongehela NF		X
USDA Forest Service – Southern Region		
George Washington and Jefferson NF		X
NF's of North Carolina		X
Francis Marion and Sumter NF-		X
Chattahoochee NF		X
Cherokee NF		X
Maine Department of Inland Fisheries and Wildlife		X
New Hampshire Department of Fish and Game		X
Vermont Fish and Wildlife		X
New York State Department of Environmental Conservation		X
Commonwealth of Massachusetts Division of Fisheries and Wildlife		X
Connecticut Department of Environmental Protection		X
New Jersey Division of Fish and Wildlife		X
Pennsylvania Fish and Boat Commission		X
Virginia Department of Game and Inland Fisheries		X
West Virginia Department of Natural Resources		X
State of Maryland Department of Natural Resources		X
Tennessee Wildlife Resources Agency		X
South Carolina Department of Natural Resources		X
Georgia Department of Natural Resources		X

The last three years the Unit has leveraged project dollars at a 5:1 ratio when in-kind contributions are added.

Eastern Brook Trout Joint Venture Risk Analysis		
U.S. Fish and Wildlife Service WO	X	
United States Geological Service	X	
Conservation Management Institute	X	X
Virginia Tech – Department of Statistics		X
Fish Passage Coarse Filters		
James Madison University- Department of Biology		X
Monongahela National Forest		X
George Washington National Forest		X
Virginia Department of Game and Inland Fisheries		X
West Virginia Department of Natural Resources		X
USDA Forest Service – Engineering (San Dimas Tech Center)	X	X
Smith Creek Restoration/Connectivity		
James Madison University- Department of Biology	X	X
U.S. Fish and Wildlife Service WO	X	X
Virginia Department of Game and Inland Fisheries		X
Rainbow Hills Farms, Inc.		X
Schull Farms		X
National Fish and Wildlife Foundation (Bring Back the Natives)	X	
Eastern Brook Trout Joint Venture	X	
George Washington National Forest- Lee Ranger District		X
Trout Unlimited		X
Wood Turtle Best Management Practices		
James Madison University- Department of Biology	X	X
Virginia Department of Game and Inland Fisheries		X
George Washington National Forest- Lee Ranger District		X
Hemlock		
Southern Research Station	X	X
James Madison University		X
George Washington NF		X
Stream Monitoring protocols comparisons		
Forest Service Region 6		X
Forest Service Region 10		X
Forest Service Region 4		X



Forest Service Region 1		X
BLM Idaho		X
BLM Oregon/Washington		X
BPA	X	
NOAA Fisheries	X	X
USFWS		X
Idaho DEQ		X
Oregon DEQ		X
Washington DEQ		X
California Fish and Game		X
Oregon ODFW		X
Environmental Protection Agency (Corvallis Office)		X
USGS		X
Washington Salmon Recovery		X
Oregon State University		X
USFS Rocky Mountain Research Station	X	X
Macroinvertebrates and stream health		
Environmental Protection Agency	X	
Bureau of Land Management	X	
Utah State University	X	
Migratory Cutthroat in the Couer d' Alene River		
Idaho Fish and Game	X	X
Idaho Panhandle National Forest	X	X
Repeatability of Rosgen Stream Classification		
Forest Service Region 6		X
Forest Service Region 1		X
Forest Service Region 4		X
Rocky Mountain Research Station	X	
Developing Aquatic Standards For Forest Plans		
Forest Service Region 1		X
Forest Service Region 4		X
Forest Service Region 6		X
Chugach National Forest		X
Boise National Forest		X
Sawtooth National Forest		X
Wenetachee National Forest		X
Umatilla National Forest		X
Wallowa-Whitman National Forest		X
Flathead National Forest		X
Lolo National Forest		X

Bank Stability (grazing)		
Forest Service WO-Range	X	
Forest Service Region 1	X	X
BLM Idaho	X	X
GIS/Wilderness/Distrubance and Stream Effects		
Remote Sensing Application Center	X	X
Payette National Forest		X
Broad scale Stream Monitoring Using GIS		
Utah State University	X	X
Remote Sensing Application Center		X
Rainbow/Cutthroat Hybridization in Teton Basin		
Friends of the Teton	X	X
Idaho Fish and Game	X	X
Utah State University	X	X
Bridger Teton National Forest		
Yellowstone and Snake River Cutthroat		
Wyoming Fish and Game		X
Bridger Teton National Forest		X
Utah State University	X	X
Aquatic Biota Technical Guide		
Utah State University	X	
Whitefish and Diversions		
Utah State University	X	X
Salmon-Challis NF	X	X
Idaho Fish and Game	X	X
BLM Idaho	X	X
Cutthroat and Grazing		
United States Geological Society	X	X
Utah State University	X	X
Utah Division of Wildlife Resources -Blue Ribbon	X	
Cache Anglers	X	X
Bonneville Chapter of the American Fisheries Society	X	X
Trout Unlimited	X	

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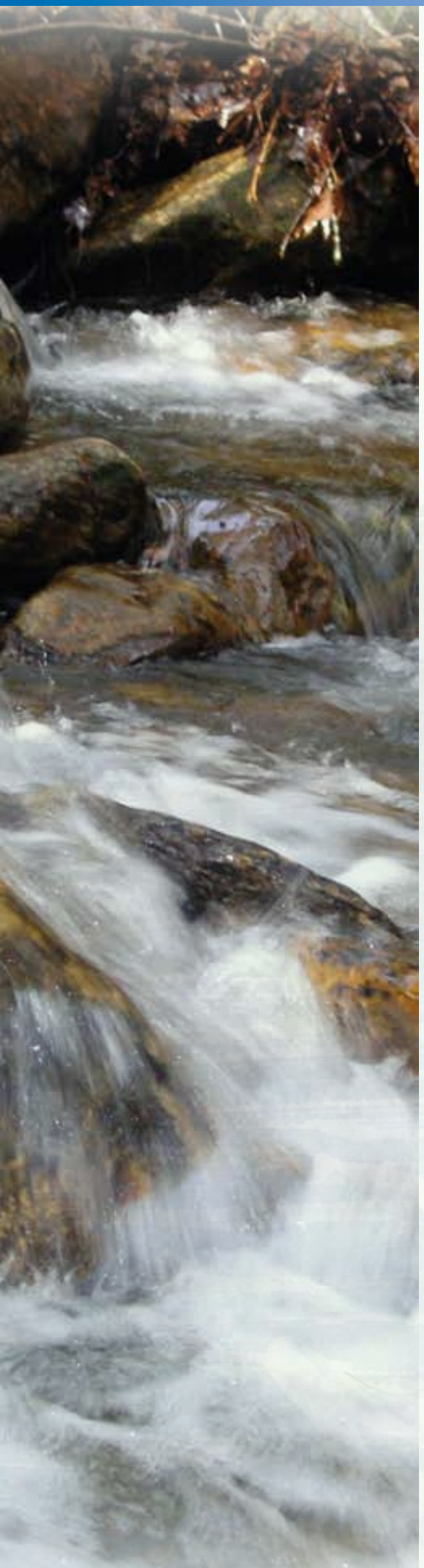

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Roper, B.B. 2006. Monitoring Aquatic Systems. Forest Service short-course on monitoring aquatic ecosystems May 16-19, Portland OR.

Roper, B.B. 2006. Aquatic Ecosystems. Continuing Education in Ecosystem Management; Forest Service Short Course. November 30, 2006

Shiflet, J., M Hyatt and M.Hudy. 2006. Do sculpins really need to move? Movement of Potomac sculpin Cottus girardi in Smith Creek, Rockingham County, VA. Annual meeting of the Virginia Chapter of the American Fisheries Society, March 2006, Winchester, VA.

Thieling, T., M. Hudy, N. Gillespie and E.P. Smith. 2006. A predicative model for Brook trout Salvelinus fontinalis populations within subwatersheds of the eastern United States. Annual meeting of the Virginia Chapter of the American Fisheries Society, March 2006, Winchester, VA.

Watts, A. and M. Hudy. 2006. Age, growth and population dynamics of Potomac sculpin Cottus girardi in Smith Creek, Rockingham County, VA. Annual meeting of the Virginia Chapter of the American Fisheries Society, March 2006, Winchester, VA.

Coffman, J. S. and M. Hudy. 2005. Evaluation of a predictive model for upstream fish passage through culverts. Southern Division AFS Annual Meeting, February 10-13, 2005, Virginia Beach, VA

Coffman, J. S. and M. Hudy. 2005. Evaluation of a predictive model for upstream fish passage through culverts. 61st Annual Northeast Fish and Wildlife Conference, April 17-20, 2005, Virginia Beach, VA

Coffman, J. S. and M. Hudy. 2005. Evaluation of a predictive model for upstream fish passage through culverts. East Coast Trout Management and Culture Workshop IV, June 6-8, 2005, Lock Haven, PA.

Coffman, J. S. and M.Hudy. 2005. Evaluation of a predictive model for upstream fish passage through culverts. 31st Annual Meeting of the Atlantic International Chapter of the American Fisheries Society, September 25-27, 2005, Rangely, ME.

Kershner, J. L. 2005. What does a productive, native fish population tell us about the health of our rivers and streams? River Management Society, Annual Meeting. Salt Lake City, Utah.

Hudy, M., T.M. Thieling, and L.O. Mohn. 2005. The biotic integrity of native brook trout watersheds in Virginia. Southern Division AFS Annual Meeting, February 10-13, 2005, Virginia Beach, VA.

Hudy, M., T.M. Thieling, L.O. Mohn, and N. Gillespie, 2005. Update on the eastern brook trout initiative: the biotic integrity of native brook trout watersheds. 61st Annual Northeast Fish and Wildlife Conference, April 17-20, 2005, Virginia Beach, VA.

Hudy, M., T.M.Thieling, L.O. Mohn, and N. Gillespie. 2005. Update on the eastern brook trout initiative: the biotic integrity of native brook trout watersheds. East Coast Trout Management and Culture Workshop IV, June 6-8, 2005, Lock Haven, PA.

Hudy, M., E.P. Smith,D.J. Spitzer,C.A. Dolloff, and C.N. Roghair. 2005. Predicting young of the year brook trout year class strengths and variability: lessons in futility? East Coast Trout Management and Culture Workshop IV, June 6-8, 2005, Lock Haven, PA.

Hudy, M., T.M. Thieling, N. Gillespie and E.P. Smith. 2005. Distribution, status and threats to brook trout within the eastern United States. 31st Annual Meeting of the Atlantic International Chapter of the American Fisheries Society, September 25-27, 2005, Rangely, ME.

McCormick, F. H, B.E. Rieman, and J.L. Kershner. 2005. Biological responses to stressors in aquatic ecosystems in western North America: cumulative watershed effects of fuel treatments, wildfire, and post-fire remediation. Cumulative effects of fuels management, Salt Lake City,

Roper, B.B. 2005. Linking large-scale data to site specific concerns related to the Clean Water Act; some thoughts on possible multi-agency collaboration and data sharing. Regional Information meeting; Forest Service and Environmental Protection Agency. March 25th 2005, Missoula MT.

Roper, B.B. 2005. Can subsections be useful strata for developing aquatic management guidelines. Wallowa-Whitman Umatilla Forest Plan Meeting, May 9th, Baker OR.

Roper, B.B. and J.L. Kershner. 2005. Does land management affect the distribution of stream attributes in wildland settings? (and what do we do if it does!). American Fisheries Society National Meeting September, Anchorage, AK

Sepulveda, A. 2005. The interaction of variable water flow conditions and temperature on the growth and survival of age-0 Atlantic salmon (Salmo salar). American Fisheries Society National Meeting September, Anchorage, AK

Thieling, T. M. and M. Hudy. 2005. Eastern brook trout initiative: a GIS assessment of brook trout population categories and anthropogenic factors. East Coast Trout Management and Culture Workshop IV, June 6-8, 2005, Lock Haven, PA.

Archer, E. K., B.B. Bouwes, and R.C. Henderson. 2005. Over 30 presentations were given to individual National Forests and BLM Resource areas. Presentations provided an overview of the Effectiveness Monitoring Project, present data from previous years, answered field unit questions, and facilitate distribution of annual reports.

Coles-Ritchie, M. C. 2005. Vegetation and streambanks. American Waters Resources Association, Seattle, WA.

Coles-Ritchie, M. C. 2005. Assessment of plant identification accuracy and implications for riparianmonitoring. Ecological Society of American. August 9, Montreal, Canada.

Fish and Aquatic Ecology Unit Graduates:
Leaders growing Leaders

A summary of some past graduates, projects, and current positions from the Fish and Aquatic Ecology Unit.

Student: Lauren Lucas Meyer (1990)
Masters Thesis: Review of restoration strategies for bony-tailed chubs
Current Position: Fisheries Biologist Medicine Bow National Forest

Student: Lee Jacobson (1990)
Current Position: Regional TES program leader

Student: Shanda Fallau Dekome (1995)
Masters Thesis: Season stream flow effect on salmonid habiat and observations of fish movement in Beaver Creek, ID/UT
Current Position: Fisheries Program Lead Idaho Panhandle NF

Student: Donna Horan (1996)
Masters Thesis: Effects of habitat degradation on Colorado river cutthroat trout populations in the Uinta Mountains streams
Current Position: Fisheries Biologist, Rocky Mountain Research Station

Student: Bryce Bohn (1998)
Masters Thesis: Watershed analysis as a strategy to determine aquatic restoration priories; an example on the Grave Creek watershed in Northwest Montana.
Current Position: Aquatics Program Lead, Beaverhead-Deerlodge NF

Student: Greg Laurie (2001)
Masters Thesis: A natural channel design to restore the Greenwater River, Washington
Current Position: Zone Hydrologist White River NF

Student: Suzanne Gebhards (2002)
Masters Thesis: Literature review of parameters used to monitor three attributes of stream channel morphology at the watershed scale.
Current Position: Hydrologist, Payette NF

Student: Bart Gamett (2002)
Masters Thesis: The relationship between water temperature and bull trout distribution and abundance
Current Position: Zone Biologist Salmon Challis NF

Student: Keith Whalen (2004)
Thesis/Dissertation/project: A risk assessment for crayfish conservation on National Forest Lands in the Eastern United States.
Current Position: Forest Fisheries Biologist, Ozark NF

Student: Dan Scaife (2004)
Masters Thesis: Examination of geomorphic and habitat variables for potiontial reference conditions of the Bighorn National Forest, Wyoming
Current Position: Fisheries Program Lead Pan Handle NF

Student: Joseph Seth Coffman (2004)
Thesis/Dissertation/project: Evaluation of a predicative model for upstream fish passage through culverts.
Current Position: Fish Passage Coordinator Region 8, Southern Research Station USDA Forest Service.

Student: Heath Whitacre (2005)
Masters Thesis: Comparison of protocols and observer precision for measurement of physical stream attributes in Oregon and Idaho streams
Current Position: Hydrologist, Petersburg Ranger District, Tongass National Forest Forest

Student: Pauline Adams (2006)
Masters Thesis: Evaluation of watershed conditions within the Grand Mesa Uncompahgre and Gunnison National Forest
Current Position: Zone Biologist GMUG

Student: Teresa M. Thieling (2006)
Thesis/Dissertation/project: Assessment and predictive model for brook trout (Salvelinus fontinalis) population status in the eastern United States.
Current Position: GIS Analyst, Superior NF

Student: Mark Novak (2006)
Doctoral Disertation: The genetics and distribution of fine spotted cutthroat trout
Current Position: Bridger-Teton National Forest

Fish and Aquatic Ecology Unit Program of Work Survey

A recently completed (August 2007) needs survey of aquatic biologists conducted for background information for the Fish and Aquatic Ecology Unit Steering Committee meeting in September 2007. Prepared by Mark Hudy and Brett Roper

Executive Summary

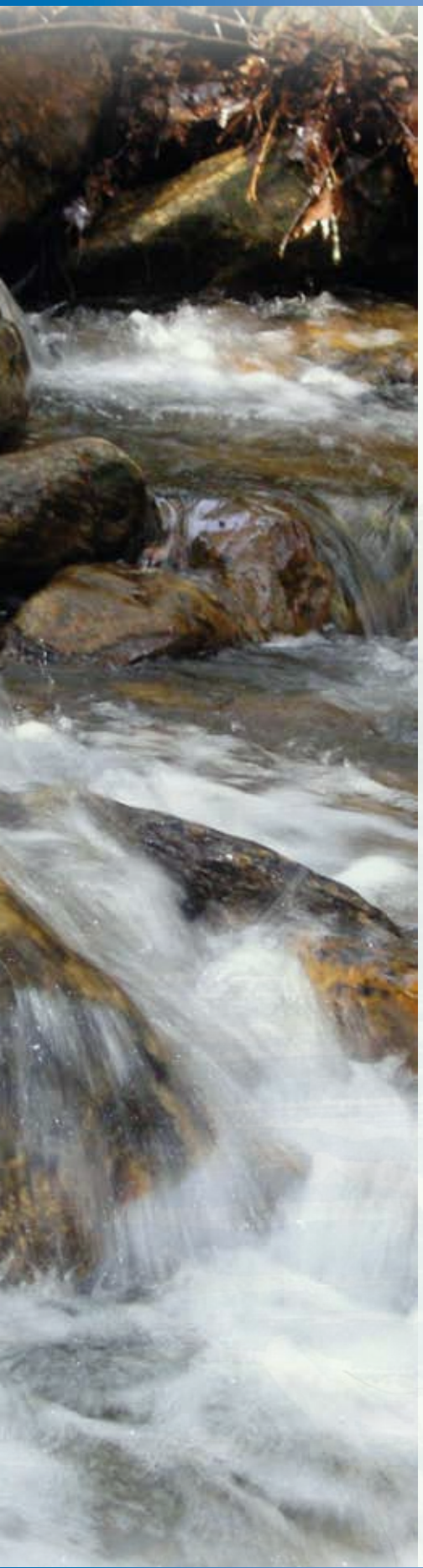
We asked fisheries biologist in the USDA Forest Service to determine what issues should be priorities for the Fish and Aquatic Ecology Unit. The most consistently identified issue was the need to evaluate/establish methods for assessing status and trend of aquatic systems. Three additional high priority issues were; 1) developing consistent aquatic protocols, 2) providing guidance in aquatic restoration and fish passage, and 3) developing short courses for continuing education related to aquatic subjects.

Asked about the need to be involved in national efforts such as standardizing aquatic protocols (the Aquatic Ecological Unit Inventory; AEUI) and/or implementing a national database (Natural Resource Information System; NRIS), the field supported developing consistent protocols while they were slightly against the development of a national database.

In responding to the survey there were some differences among regions and levels of the organizations. Several regions were more strongly in favor of help in developing approaches to evaluate status and trend and consistent national aquatic monitoring protocols than were other Regions. Forest and Regional biologists were more likely to express a desire for help gaining GIS skills while Zone and District Biologist would prefer the Unit to make more site visits.

While the Field Units suggested several avenues where the Fish and Aquatic Ecology Unit could help, is clear that they feel the additional administrative burden they are facing is a major roadblock in their ability to get work done on the ground. Funneling more money to the ground may not result in additional work if biologists in the field have to spend more time completing these administrative tasks.

The results of this survey indicate that fisheries biologist within the Forest Service appreciates help from the Fish and Aquatic Ecology Unit in addressing a variety of topics that transcend administrative boundaries. While the exact Fish and Aquatic Ecology Unit priorities would likely vary among Regions, among levels of the organization, and among individuals, they see the primary role of the Unit as providing technical guidance and/or direction in the assessment of aquatic ecosystems.



Introduction

Over the last five years the Forest Service's Fisheries Program and the Fish and Aquatic Ecology Unit have undergone significant changes. These changes were the result of changing personnel, priorities, and the relationships between the National Programs and the Region's, Forest's and District's biologist. The Fish and Aquatic Ecology Unit attempts to relate national priorities to emerging technical issues and then work with aquatic professionals in the Regions, Forests and Districts to ensure national concerns are addresses at a local level.

Staff reductions occurring on Forests and Districts, make it increasingly difficult for individuals working at the ground level to have time to spend on issues that span multiple Forests or Regions. The Fish and Aquatic Ecology Unit directs most of its work to fill this gap. While the Fish and Aquatic Ecology Unit does work at multiple scales it is sometimes difficult to determine (without bias) the critical technical needs of the field. To better assess these needs we conducted a national survey of Forest Service fisheries biologist to access the needs of the field.

Methods

The Regional Fish Program Leaders sent out this survey to individuals within their regions. We have received 83 useable responses, representing approximately 20% of the fisheries biologists in the Forest Service. This number of responses was sufficient to determine if there were Regional differences or differences among the administrative levels.

Results

To better understand which emerging issues the Fish and Aquatic Ecology Unit should work on, we asked the respondents to rank 10 issues, where the most important issue received a 1 and the least important received a 10. As can be expected, there was considerable disagreement among individuals in what they determined were the most important issues.

Table 1. Aquatic biologists order or importance (mean values in parenthesis) for ten issues.

(1) Determine approaches for evaluating the status and trend of aquatic systems. (mean 3.2)
(2) Standardize methods to be used to evaluate aquatic systems (mean 4.62)
(3) Provide principles necessary for implementing aquatic restoration/fish passage (mean 5.3)
(4) Conduct short-courses on emerging issues (mean 5.46)
(5) Develop GIS and remote sensing tools for analysis of aquatic systems (mean 5.71)
(6) Visit Forests and Districts to develop monitoring plan and analyze data (mean 5.9)
(7) Determine protocols for assessing the effects of introduced species (mean 6)
(8) Provide reviews of aquatic strategies used by Forest and Districts (mean 6.01)
(9) Develop Forest Plan Standards for aquatic systems (mean 6.19)
(10) Provide synoptic reviews of new scientific literature (mean 6.8)

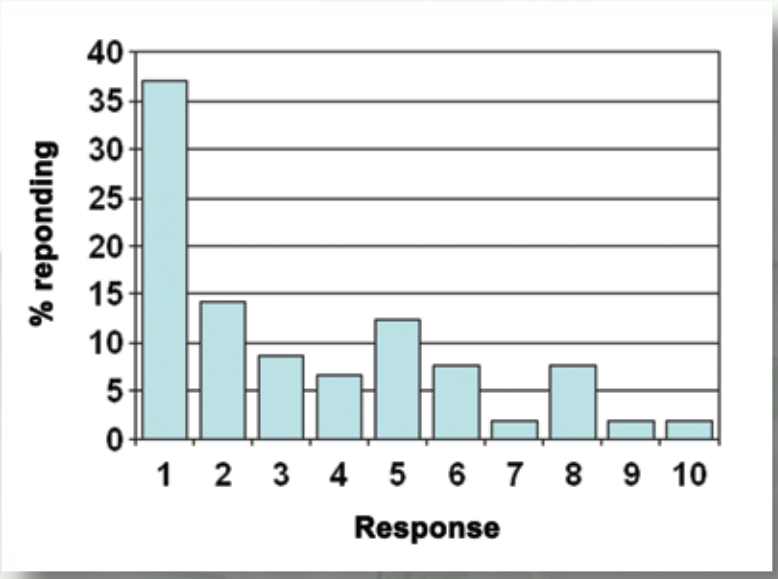


Figure 1. Distribution of responses to need to: "(1) Determine approaches for evaluating the status and trend of aquatic systems". The number 1 is the most important need while a 10 is the least important need.

Determining approaches for evaluating the status and trend of aquatic systems was the most important issue. The respondents were consistent in how they ranked the importance of this issue with greater than 35% of the respondent ranking it as they most important issue (Figure 1).

The field identified two issues that were more importance than the others (Figure 2). The identified issues, "determining status and trend" and "standardizing protocols", were related in that both are needed to evaluate the large-scale effects of Forest Service management.

It was interesting that the least important issue was providing synopsizes of existing literature. Five years ago this was often seen as an important issue because of the difficulty in obtaining peer reviewed literature. With the presence of Digitop, much of the needed literature can be directly download from the internet. It is clear the proliferation of technology could alter the type of help held in high regard by the field.

Another interesting observation was that the need for help in planning restoration/fish passage was the third highest rated task. This task likely would have rated higher if it not for the large effort the Fish and Aquatic Ecology Unit has already spent on this task. This work, especially related to aquatic passage, has included collaboration with other program areas within the Forest Service as well as collaboration with field units throughout the Agency.

We also asked whether the two different national efforts affecting aquatics; standardizing aquatic protocols (the Aquatic Ecological Unit Inventory; AEUI) and implementing a national database (Natural Resource Information System; NRIS) were important. In general, the respondents were in favor (70% very important to neutral; Figure 3) of standardized protocols, while respondents were slightly against the national database effort (70% neutral to Not very important). On face value these conclusions seem to be contradictory in that if you have standardized protocols it is very easy to standardize databases. There are two explanations for this apparent contradiction; 1) that many people collect information on the same attributes and want standardized protocols so that they can share data but 2) because there is increasing

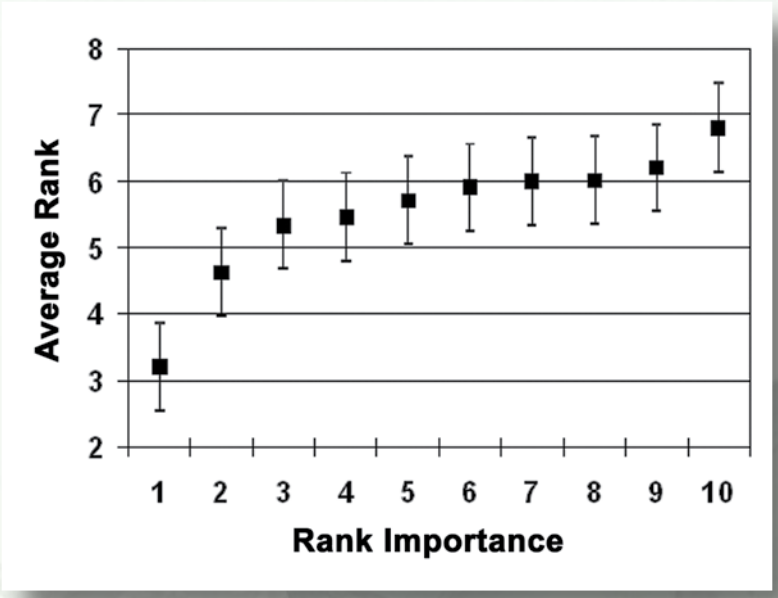


Figure 2. The average ranks (square boxes) of the 10 issues with their associated 95% confidence intervals (lines). The rank importance is listed above where 1 is help with status and trend while 10 is help with synoptic reviews of new scientific literature (see table 1).

ability at the scale of the district to store data in both tabular and spatial interfaces the don't want to lose the ability to analyze the data in a way the field sees fit. Having consistent protocols would enable the field to conduct analysis at a scale, which is meaningful to them, rather than having scale of analysis be determined at a national level.

Generally, ranking of issues were similar among regions. Regions 5 and 6 have a lower need for developing national approaches to evaluate status and trend. Since Regions 5 and 6 already have the Northwest Forest Plan, Sierra Nevada Plan and a regionally consistent Aquatic Conservation Strategy,

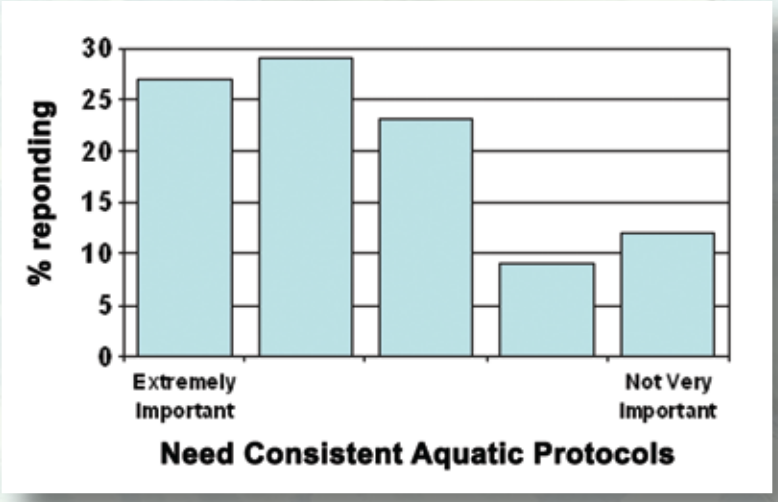


Figure 3. The distribution of responses (n = 67) identifying the need to have nationally consistent aquatic monitoring protocols.

it is likely individuals in these regions feel more comfortable with the tasks of evaluating status and trend of aquatic ecosystems at a larger scale. Regions 1, 2, 5, 8 and 10 also felt more strongly about the need for consistent national aquatic monitoring protocols than the remaining regions. Finally, Region 1, 3, 5, 6 and 9 indicated a stronger need for the Fish and Aquatic Ecology Unit to offer short courses than do Regions 4 and 8.

There were also two differences based on the level of the organization of the employee (Region/Forest versus Zone/District). Region and Forest Fisheries Biologist indicated a stronger desire to acquire GIS skills than did Zone or District Fisheries Biologist. This difference could be because the scale of analysis is greater at the Region/Forest level resulting in a need for a tool, such as GIS, to conduct larger scale analysis. In contrast, the finer scale work done by Zone/District biologist could be primarily addressed by field visits rather than GIS. The other difference was the desire to have the Fish and Aquatic Ecology Unit conduct site visits and help the field unit conduct work. Not surprisingly, the Zone/District fisheries biologists were more in favor of this than the Region/Forest biologist.

The final component of the questionnaire was an open-ended question that asked, "Other than money, what keeps you from doing you job effectively?" The most common response (28% of the respondents) suggested that the increased administrative tasks, such as AgLearn, Grant and Agreement, and Human Capitol Management, that are now handled by the biologist rather than support staff keeps them from completing on-the-ground work. Such a high number of similar responses to an open ended question indicates that this problem in likely a severe constraint to people getting there job done. The next most common response was the lack of leadership (9% respondents). It was not clear whether this concern was focused at local or national leadership. The recent hiring of the National Program Leader, may address some of the fields concerns. In addition, the field identified regulatory hurdles such as NEPA and ESA (6%), difficultly in determining desired future condition (6%), and the fact the fisheries were not a priority (5%) as reasons for not completing their job effectively.

In conclusion, the results of this survey indicate that fisheries biologists utilize the Unit in addressing a variety of topics. The fields view of the exact priorities for the Fish and Aquatic Ecology Unit vary among Regions, between levels of the organization, and among individuals. Although there is considerable variability in the opinions of these professionals, it is clear the field see the role of the Unit as (1) a mechanism to provide national technical guidance/direction in evaluating the status and trend of aquatic systems, (2) promoting consistent aquatic monitoring protocols, and (3) providing principles for aquatic restoration. While there are clear avenues the field sees in how the Unit can augment their efforts, is also clear that they see the shift of administrative functions to the ground as a major roadblock in their ability to get work done.

Back Cover Photos:
Top: The FAEU Unit conducts projects in all regions of the National Forest System.
Bottom: Over 90% of remaining habitats for many inland fishes are found on National Forest Land.

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