Eli Felts

Fisheries Biologist

Lenore, Idaho

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Education

South Dakota State University — *Brookings, SD*

Doctor of Philosophy, Wildlife and Fisheries Sciences — *2018*

South Dakota State University — *Brookings, SD*

Master of Science, Wildlife and Fisheries Sciences — *2013*

University of Wisconsin-Oshkosh — *Oshkosh, WI*

Bachelor of Science, Biology — *2010*

Work Experience

U.S. Fish & Wildlife Service — *Orofino, Idaho*

Deputy Project Leader — *Apr. 2024 - Feb. 2025*

- Provided coordination and liaison with private, Tribal, public conservation, and governmental entities throughout Idaho and adjacent states to foster habitat preservation, conservation, and restoration efforts
- Collaborated with partners and regional managers to direct evaluation efforts of two National Fish Hatcheries operated and managed by the Nez Perce Tribe
- Developed short and long-range plans, objectives, and priorities for data collection and management activities of the Idaho Fish and Wildlife Conservation Office
- Promoted the Fish and Wildlife Service's position and interests on fishery and aquatic resources through interagency forums and committees to influence the decision making of these groups to ensure adoption of the best scientifically based management and/or recovery measures for bull trout, cutthroat trout, Pacific lamprey, Pacific salmon, and other fish and wildlife resources
- Maintained related databases and ensured that associated correspondence is completed thoroughly and on a timely basis
- Represented the region in biological surveys and management of imperiled native fishes in Idaho and adjacent states with responsibility for assisting in planning, directing, and coordinating recovery activities with cooperators
- Assisted in the development and review of project study plans to ensure the validity of experimental design, statistical rigor, and scientific merit
- Provided written recommendations to the project leader
- Provided technical expertise in the field of population dynamics, population estimates, resource and statistical modeling, statistical treatment of data, and provided advice to biologists in the applications of biometrics to study results and data interpretations
- Applied statistical consepts and innovative techniques to the evaluation and resolution of aquatic resource problems
- Conducted surveys of fishery resources and associated habitats using a variety of field collection methods
- Studied and determined the status of populations of rare species as needed by selecting appropriate data collection methods
- Collaborated with Rocky Mountain Research Station scientists to author the hatchR package for implementing fish phenology models in R
- Developed an R Shiny application for modeling hatch and emergence date of stream fish based on temperature observations
- Designed Survey123 forms for data collection and associated R scripts to import data from electronic field forms into associated databases
- Authored funding proposals for bull trout recovery funds
- Coordinated with Idaho Department of Fish and Game in planning and execution of a brook trout removal project in the North Fork Clearwater drainage
- Mentored junior biologists and interns
- Assisted in development of climate change vulnerability assessments for hatcheries managed under the Lower Snake River Compensation Plan
- Implemented Cormack-Jolly-Seber models to estimate survival of PIT-tagged juvenile hatchery salmonids using Program MARK via the RMark package in R
- Utilized PIT tag data to characterize movement patterns and life history of bull trout
- Assisted in bull trout field investigations led by partners in the US Forest Service
- Provided technical expertise to a workgroup scoping the feasibility and requirements of alternative water sources for Dworshak National Fish Hachery
- Participated in bull trout regional workgroups
- Reviewed fish passage project proposals and designs
- Built spatial data layers associated with bull trout hierarchical units outlined in recovery planning documents
- Assisted with marking and data interrogation for a PIT tagging study designed to assess movement and survival of translocated Pacific lamprey
- Wrote R scripts and accompanying instructions to improve the process of querying and summarizing large data requests from the PTAGIS, the regional database for PIT tag data in the Columbia River basin

Idaho Department of Fish and Game *Lewiston, Idaho*

Fisheries Research Biologist *Oct. 2021 - Apr. 2024*

- Provided technical advice to fisheries managers related to fisheries resources issues on Dworshak Reservoir and Lake Pend Oreille
- Applied population statistics and models to monitor trends and provide forecasts for fish populations in Dworshak Reservoir and Lake Pend Oreille
- Designed and implemented research to evaluate the impact of nutrient additions on fishery resources in Dworshak Reservoir
- Coordinated fishery resource restoration efforts for Dworshak Reservoir among Idaho Department of Fish and Game, U.S. Army Corps of Engineers, Idaho Department of Environmental Quality, and a private contractor
- Communicated biological information in writing through annual reports and peer-reviewed publications
- Communicated biological information verbally in presentations at conferences and scientific meetings
- Designed and maintained databases for storing and accessing fisheries and limnological data
- Collaborated with U.S. Fish and Wildlife Service and U.S. Forest Service to implement annual bull trout redd counts in the North Fork Clearwater drainage
- Investigated aquatic food web dynamics of Lake Pend Oreille
- Conducted trawl and hydroacoustics surveys to quantify abundance and age structure of kokanee populations
- Processed and analyzed hydroacoustics data
- Monitored limnology of Dworshak Reservoir to ensure compliance with requirements for permitted nutrient additions
- Used advanced statistical techniques to analyze and interpret field data
- Collaborated with fellow Idaho Department of Fish and Game fishery research biologists
- Developed a dashboard using R Shiny applications to visualize trends and relationships in fishery population characteristics of Dworshak Reservoir and Lake Pend Oreille
- Designed and implemented creel surveys on Lake Pend Oreille and Dworshak Reservoir
- Designed a Survey123 form to collect creel survey information using tablets and smartphones
- Wrote R scripts to import and process creel survey data collected using Survey123
- Developed a dashboard using R Shiny applications to visualize and download outputs from creel surveys
- Designed and implemented an acoustic tagging study to quantify annual movement patterns of smallmouth bass in Dworshak Reservoir
- Designed and implemented an acoustic tagging study to quantify annual movement patterns and characterize life history of bull trout in Dworshak Reservoir and the North Fork Clearwater River
- Wrote R scripts to import, process, and visualize acoustic tracking data from both mobile and passive receivers
- Collaborated with other IDFG staff to develop an R Shiny application to map and visualize trends of bull trout redd counts
- Wrote blog posts for the IDFG website to communicate results and relevance of work to the public
- Supervised one permanent and as many as 4 seasonal staff
- Served as a reviewer for internal reports and peer-reviewed journals

Idaho Department of Fish and Game *Lewiston, Idaho*

Anadromous Fisheries Biologist *Apr. 2017 - Oct. 2021*

- Provided technical advice to fisheries biologists and anadromous fisheries managers related to wild Chinook salmon and steelhead throughout the state of Idaho
- Applied population statistics and models to monitor trends and provide forecasts for wild anadromous fish populations in Idaho
- Lead author and presenter for Idaho Salmon and Steelhead Monitoring and Evaluation Studies proposal to the Northwest Power and Conservation Council in 2021
- Consulted with National Marine Fisheries Service on status assessment of ESA-listed Snake River Spring-Summer Chinook salmon
- Coordinated with U.S. Forest Service, Nez Perce Tribe, and Shoshone-Bannock tribes annually to implement spatially continuous Chinook salmon redd counts of all potential spawning areas in the Middle Fork Salmon River drainage
- Communicated biological information in writing through annual reports and peer-reviewed publications
- Communicated biological information verbally in presentations at conferences and scientific meetings
- Assisted Principle Biologist with planning, staffing, budgeting, and supervision of Idaho Department of Fish and Game Wild Salmon and Steelhead Monitoring and Evaluation studies
- Led annual, statewide training workshops to standardize Chinook Salmon spawning ground survey methods across collaborating agencies in the state of Idaho
- Represented Idaho Department of Fish and Game on the Pacific Lamprey Conservation Initiative Conservation Team
- Investigated the influence of environmental and climatic variability on distribution and abundance of native Chinook Salmon in Idaho across multiple spatial scales
- Used advanced statistical techniques to analyze and interpret field data
- Led Idaho Department of Fish and Game Chinook Salmon spawning ground surveys
- Operated rotary screw traps to estimate Chinook Salmon and steelhead emigrant abundance
- Served as contract manager for Idaho Salmon and Steelhead Monitoring and Evaluation Studies project funded by Bonneville Power Administration
- Developed R code and accompanying Shiny application to automate the process of importing and formatting data, and producing metrics and visualizations that indicate status of wild Chinook Salmon in Idaho
- Supervised a full-time data coordinator ensuring high standards of data quality, accessibility, and transparency
- Co-authored a peer-reviewed publication about the effects of habitat restoration on Chinook Salmon in the Pahsimeroi River, Idaho
- Conducted simulation analysis to refine and improve efficiency of sampling protocols for Chinook Salmon redd counts in remote terrain of central Idaho
- Analyzed carcass collection data to provide recommendations for sample size targets
- Worked to standardize sampling protocols for Pacific Lamprey in Idaho
- Consulted with National Marine Fisheries Service about empirical stock-recruit relationships and implications of density-dependence of Idaho populations of Chinook Salmon
- Served as reviewer for internal reports and peer-reviewed journals

South Dakota State University *Brookings, South Dakota*

Graduate Research Assistant (Ph.D) *May. 2013 - May. 2017*

- Provided technical advice to biologists with South Dakota Department of Game, Fish, and Parks, and North Dakota Game and Fish Department about management of Missouri River walleye
- Designed and implemented multiple year mark-recapture study of walleye in a large Missouri River reservoir to quantify the effects of historic flooding on angling and natural mortality
- Designed and implemented a mark-recapture study to estimate tag reporting rate and tag shedding rate of walleye marked with jaw tags
- Led and participated in field activities to capture, mark, and collect biological data from walleye using a variety of gears including trap nets, boat electrofishing, and gill nets
- Led efforts to collect information from angler recoveries of tagged walleye
- Designed and managed an Access database for storing and querying mark-recapture data
- Quantified total and angling mortality from walleye mark-recapture data using dead recoveries models in program MARK
- Supervised undergraduate technicians who helped with field efforts and collection of angler recovery data
- Utilized long-term monitoring data to investigate stock-recruitment relationships and influences of environmental variables of walleye recruitment in Missouri River reservoirs
- Utilized long-term monitoring data to assess factors influencing angler catch rates for walleye in Missouri River reservoirs
- Prepared manuscripts for submission to peer-reviewed journals
- Presented findings of graduate research at professional society meetings, and to angling groups
- Acted as teaching assistant for two semesters and lead instructor for one semester for an upper level undergraduate fisheries course

South Dakota State University *Brookings, South Dakota*

Graduate Research Assistant (M.S.) *Jul. 2010 - Apr. 2013*

- Investigated factors influencing distribution and abundance of rare stream fishes in western South Dakota
- Characterized fish assemblage structure in western South Dakota streams
- Identified and vouchered fish specimens for the South Dakota State University ichthyology collection
- Sampled stream fish assemblages using seines and backpack electrofishing
- Collected, processed, and prepared otoliths from small stream fish for age estimation
- Consulted with South Dakota Department of Game, Fish, and Parks on their State Wildlife Action Plan
- Acted as teaching assistant for one semester of ichthyology
- Collaborated with geneticists at University of New Mexico to study the genetic structure of mountain sucker in the Black Hills of South Dakota
- Prepared manuscripts for submission to peer-reviewed journals
- Presented findings of graduate research at professional society meetings

Wisconsin Department of Natural Resources *Oshkosh, Wisconsin*

Fisheries Technician *May. 2009 - Jul. 2010*

- Conducted stream electrofishing surveys to quantify relative abundance of trout species
- Sampled stream fish assemblages to quantify index of biotic integrity
- Captured and tagged walleye using boat electrofishing
- Collected biological information from walleye at angling tournaments
- Analyzed stomach contents of lake sturgeon
- Collected and processed ageing structures including otoliths, fin rays, and scales from a variety of fish species
- Acted as second reader for age estimation of walleye, northern pike, and muskellunge
- Performed maintenance and repair of fish sampling gear
- Captured spawning lake sturgeon for collection of biological samples

Wisconsin Department of Natural Resources *Oshkosh, Wisconsin*

Fisheries Technician (Volunteer) *Jun. 2008 - Aug. 2008*

- Participated in stream electrofishing surveys
- Assisted with maintenance and repair of electrofishing equipment

Technical Proficiencies

Program R

- Data import from flat files and database
- Data cleaning and organization
- Data visualization
- Statistical analysis and modeling
- Spatial data analysis and mapping
- Function writing and package development
- Shiny application devlopment
- Functional programming for iteration
- Markdown to produce interactive, reproducible reporting and presentations in HTML, PDF, and Microsoft Office formats
- Portal to utilize specialized statistical programs including JAGS, NIMBLE, MARK, Presence

Microsoft Office

- Excel
- Access
- OneNote
- Outlook
- OneDrive

Git

- Version control
- Collaborative software and analysis development
- Open, reproducible analysis

ArcGIS Survey123

- Electronic field form design for data collection
- Restricted form fields to reduce errors
- Customized surveys which react to user inputs (based on Python code)

Peer-reviewed Journal Articles

Felts, E. A., M. J. Fincel, and B. D. S. Graeb. 2021. Angler reporting and tag retention estimates for Walleye in Lake Oahe. Fisheries Research. 243: 106096.

Copeland, T., D. Blythe, W. Schoby, E. Felts, and P. Murphy. 2021. Population effect of a large-scale stream restoration effort on Chinook salmon in the Pahsimeroi River, Idaho. River Research and Applications. 37: 100–110.

Felts, E. A., M. J. Fincel, and B. D. S. Graeb. 2020. Effects of reservoir elevation and spatial synchrony on Walleye recruitment in Lake Oahe, Missouri River. North American Journal of Fisheries Management. 40: 1133–1145.

Bertrand, K. N., J. A. VanDeHey, T. J. Pilger, E. A. Felts, and T. F. Turner. 2016. Genetic structure of a disjunct peripheral population of mountain sucker *Pantosteus jordani* in the Black Hills, South Dakota, USA. Conservation Genetics. 17: 775–784.

Felts, E. A., and K. N. Bertrand. 2014. Conservation status of five headwater stream specialists in South Dakota. The American Midland Naturalist. 172: 131–159.

Felts, E. A., K. N. Bertrand, and B. D. S. Graeb. 2014. Northern pearl dace population structure and demographics in southwestern South Dakota streams. The Prairie Naturalist. 46: 70–74.

In Review

Sparks, M. R., E. A. Felts, A. G. Swartz, and B. M. Maitland. hatchR: A toolset to predict when fish hatch and emerge. Fisheries.

Technical Reports

Felts, E. A., S. M. Wilson, A. M. Piette, and R. S. Hardy. 2023. Dworshak dam resident fish mitigation progress eport, 2019-2023. Idaho Department of Fish and Game Report 23-02, Boise.

Nau, C. I., E. A. Felts, B. Barnett, M. Davison, C. McClure, J. R. Poole, R. Hand, and E. Brown. 2021. Idaho adult Chinook Salmon monitoring. Annual report 2020. Idaho Department of Fish and Game Report 21-08, Boise.

McClure, C., B. Barnett, E. A. Felts, M. Davison, N. Smith, B. A. Knoth, J. R. Poole, and S. F. Feeken. 2021. Idaho anadromous emigrant monitoring. Annual report 2020. Idaho Department of Fish and Game Report 21-11, Boise.

Felts, E. A., B. Barnett, M. Davison, K. M. Lawry, C. McClure, J. R. Poole, R. Hand, M. Peterson, and E. Brown. 2020. Idaho adult Chinook Salmon Monitoring. Annual report 2019. Idaho Department of Fish and Game Report 20-06, Boise.

Feeken, S. F., B. Barnett, E. A. Felts, E. J. Stark, M. Davison, J. R. Poole, C. McClure, B. A. Knoth, and M. E. Dobos. 2020. Idaho anadromous emigrant monitoring. Annual report 2019. Idaho Department of Fish and Game Report 20-09, Boise.

Copeland, T., W. C. Schrader, B. Barnett, M. Davison, K. A. Apperson, M. Belnap, E. Brown, and E. A. Felts. 2019. Idaho Chinook Salmon spawning ground surveys: Protocols and historic trends. Idaho Fish and Game Annual Report 19-16, Boise.

Felts, E. A., B. Barnett, M. Davison, C. J. Roth, J. R. Poole, R. Hand, M. Peterson, and E. Brown. 2019. Idaho adult Chinook Salmon monitoring. Annual report 2018. Idaho Department of Fish and Game Report 19-10, Boise.

Poole, J. R., E. A. Felts, M. E. Dobos, B. Barnett, M. Davison, C. J. Roth, B. A. Knoth, and E. J. Stark. 2019. Idaho anadromous emigrant monitoring. Annual report 2018. Idaho Department of Fish and Game Report 19-11, Boise.

Felts, E. A., B. Barnett, M. Davison, M. Belnap, K. A. Apperson, R. Hand, M. Peterson, and E. Brown. 2018. Idaho adult

Chinook Salmon monitoring. Annual report 2017. Idaho Department of Fish and Game Report 18-08, Boise.

Felts, E. A., and K. N. Bertrand. 2014. Comparison of barge and backpack electrofishing for sampling fish assemblages in small South Dakota streams. Fisheries Division Report, Pierre.

Contributed Presentations

Felts, E. A., and R. S. Hardy. 2024. Smallmouth bass response to tournament displacement in a highland Idaho reservoir. Spokane, WA.

Felts, E. A., and M. J. Fincel. 2022. Management lessons learned from a large midwest reservoir Walleye population. Spokane, WA.

Felts, E. A. 2021. Comparison of methods for estimating age composition of Chinook Salmon populations when the bears beat you to the carcasses. Virtual.

Felts, E. A. 2018. Density dependence and "capacity" of spring/summer Chinook salmon populations in Idaho. McCall, Idaho.

Copeland, T., E. A. Felts, M. Biggs, W. Schoby, and P. Murphy. 2018. Assessment of habitat restoration effects on the Pahsimeroi River Chinook Salmon population. Idaho Falls, Idaho.

Felts, E. A., M. J. Fincel, and B. D. S. Graeb. 2017. Walleye population variability affects angler catch rates and harvest decisions in Missouri River reservoirs. Jamestown, North Dakota.

Kludt, N. B., E. A. Felts, M. J. Fincel, and B. D. S. Graeb. 2017. Effects of competition, predation, and environment on recruitment of a pelagic forate fish, Lake Herring Coregonus artedi, in a Missouri River reservoir. Jamestown, North Dakota.

Felts, E. A. 2016. Walleye reproduction: What keeps walleye researchers up at night. Deadwood, South Dakota.

Felts, E. A., M. J. Fincel, and B. D. S. Graeb. 2015. Factors affecting recruitment of Walleye in Lake Oahe, South Dakota, 1985-2011. Bismarck, North Dakota.

Felts, E. A., M. J. Fincel, and B. D. S. Graeb. 2014. Factors affecting recruitment of Walleye in Lake Oahe, South Dakota, 1985-2011. Quebec City, Quebec.

Fincel, M. J., C. J. Longhenry, and E. A. Felts. 2014. What impacts return-to-angler of landlocked Chinook Salmon in a larger reservoir? Quebec City, Quebec. (Poster).

Bertrand, K. N., J. A. VanDeHey, T. J. Pilger, E. A. Felts, J. J. Breeggemann, C.-A. Hayer, J. R. Krause, L. D. Schultz, B. D. S. Graeb, and T. F. Turner. 2014. Mountain sucker ecology, conservation genetics, and population dynamics. Southwest Association of Naturalist 61st Annual Meeting, Stillwater, Oklahoma.

Johnston, R., T. M. Stevens, E. A. Felts, and B. D. S. Graeb. 2014. Age and growth of Channel Catfish in a South Dakota natural lake. Chamberlain, South Dakota. (Poster).

Felts, E. A., and K. N. Bertrand. 2014. Ecology of glacial relict fishes in South Dakota's sandhills region. Loveland, Colorado.

Leonard, M., E. A. Felts, M. Wagner, K. N. Bertrand, and K. Gido. 2012. Comparison of creek chub populations in Shadley Creek, South Dakota and Kings Creek, Kansas. Wichita, Kansas.

Felts, E. A., and K. N. Bertrand. 2012. Distribution patterns of state threatened and endangered species in southwest South Dakota. St. Paul, Minnesota.

Felts, E. A., and K. N. Bertrand. 2012. Species richness patterns in South Dakota streams: Implications for conservation. Chamberlain, South Dakota.

Felts, E. A., and K. N. Bertrand. 2011. Detection and occupancy modeling of glacial relict fishes in the Sandhills region of South Dakota. Des Moines, Iowa.

Felts, E. A., and K. N. Bertrand. 2011. Assessing distribution and habitat associations of glacial relict fishes in South Dakota's Sandhills. Bismarck, North Dakota.

Professional Society Memberships

American Fisheries Society, Parent Chapter	*2012 - Present*
American Fisheries Society, Idaho Chapter	*2017 - Present*
American Fisheries Society, Dakota Chapter	*2010 - 2017*

Honors Received

Lloyd and Alice Frederickson Memorial Scholarship for Outstanding Fisheries Ph.D. Student *2017*

Great Plains Fishery Workers Association Scholarship for Outstanding Fisheries M.S. Student *2013*

References

John Erhardt *john_erhardt@fws.gov*

Project Leader, U.S. Fish and Wildlife Service

Ryan Hardy *ryan.hardy@idfg.idaho.gov*

Principle Fisheries Biologist, Idaho Department of Fish and Game

Joe DuPont *joe.dupont@idfg.idaho.gov*

Regional Fisheries Manager, Idaho Department of Fish and Game