State of Utah
DEPARTMENT OF NATURAL RESOURCES
Division of Wildlife Resources – Native Aquatic Species

RANGEWIDE
CONSERVATION AGREEMENT AND STRATEGY
FOR
NORTHERN LEATHERSIDE
(*Lepidomeda copei*)

Publication Number 09-11
Utah Division of Wildlife Resources
1594 West North Temple
Salt Lake City, Utah
James F. Karpowitz, Director

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Prepared by:

Utah Division of Wildlife

June 2009

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Cover photograph by Eric Wagner.

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DEFINITIONS AND ABBREVIATIONS

For the purpose of this Agreement and Strategy, the following terms are defined as follows:

BLM – The Bureau of Land Management.

BOR – The Bureau of Reclamation.

Geographic Management Unit (GMU) – A distinct area, defined by historic northern leatherside range and hydrologic and geographic boundaries.

Historic Range – The area that northern leatherside is perceived to have inhabited at the time of modern exploration and settlement of the West (Approximately 1850).

HUC – Hydrologic Unit Code. Based on United States Geological Survey National Hydrography Dataset. Identifies hydrologic units for entire United States.

IDFG – Idaho Department of Fish and Game.

Leatherside chub – Refers to *Gila copei* prior to the change in taxonomy for the species. Also may be used when quoting other documents, or for introduced locations where the species is not known.

NDOW – Nevada Department of Wildlife.

Northern leatherside – Common name for *Lepidomeda copei* that the NLSCT elected to use because taxonomically the species is no longer considered a chub or as belonging to the genus *Gila*.

NPS – National Park Service.

Service – The United States Fish and Wildlife Service.

Threat – Any action or activity, past or present, that currently or in the future may prevent the continued existence of northern leatherside. Conditions such as pollution and the presence of non-natives may also constitute threats.

TNC – The Nature Conservancy.

UDWR – Utah Division of Wildlife Resources.

USFS – United States Forest Service.

WGFC – Wyoming Game and Fish Commission.

WGFD – Wyoming Game and Fish Department.

RANGEWIDE CONSERVATION AGREEMENT

FOR

NORTHERN LEATHERSIDE

(*LEPIDOMEDA COPEI: CYPRINIDAE*)

BACKGROUND

This Conservation Agreement (Agreement) has been developed to expedite implementation of conservation measures for northern leatherside (*Lepidomeda copei*) in Utah, Wyoming, Nevada, and Idaho as a collaborative and cooperative effort among resource agencies. Threats exist that may warrant listing of northern leatherside as sensitive by state and federal agencies, and as Threatened or Endangered under the Endangered Species Act of 1973. These threats should be significantly reduced or eliminated through implementation of this Agreement and the accompanying Conservation Strategy (Strategy).

Goal

Ensure the long-term persistence of northern leatherside within its historic range and support development of multi-state conservation efforts.

Objectives

The following objectives will be required to attain the goal of this Strategy:

Objective 1 – Identify and reduce threats to northern leatherside and its habitat.
Objective 2 – Determine the existing range of the species.
Objective 3 – Maintain and monitor existing self-sustaining populations and their habitat.
Objective 4 – Restore populations at selected localities within the historic range.
Objective 5 – Augment selected populations if necessary.
Objective 6 – Maintain genetic diversity.
Objective 7 – Identify questions and implement research that meet management needs for northern leatherside and use the findings to better meet the goal and objectives of this Conservation Strategy.
Objective 8 – Implement and incorporate provisions of the Conservation Strategy into signatory planning documents and budgets to ensure the conservation goal and objectives are achieved.

These objectives will be reached through implementation of the Strategy. The status of northern leatherside will be evaluated annually to assess program progress and ensure program effectiveness.

I. OTHER SPECIES INVOLVED

The primary focus of this Agreement is the conservation and enhancement of northern leatherside and the ecosystems upon which they depend; however, other species occurring within or adjacent to northern leatherside habitat may also benefit. Some of these species include Bonneville cutthroat trout (*Oncorhynchus clarkii utah*), Yellowstone cutthroat trout (*Oncorhynchus clarkii bouvieri*), mountain whitefish (*Prosopium williamsoni*), Paiute sculpin (*Cottus beldingii*), boreal toad (*Bufo boreas*), mottled sculpin (*Cottus bairdii*), Utah chub (*Gila atraria*), Utah sucker (*Catostomus ardens*), mountain sucker (*Catostomus platyrhynchus*), speckled dace (*Rhinichthys osculus*), longnose dace (*Rhinichthys cataractae*), bridgelip sucker (*Catostomus columbianus*), and redside shiner (*Richardsonius balteatus*). By emphasizing the conservation of habitats and ecosystems where northern leatherside occur, the accomplishment of actions identified in the Strategy should significantly reduce or eliminate threats for several of these species, and the need for federal listing pursuant to the Endangered Species Act (ESA).

II. INVOLVED PARTIES

The following agencies are committed to work cooperatively to conserve the northern leatherside throughout its range, and have determined that a consistent approach, as described in this Agreement, is most efficient for conserving the species. The signatories to this document are:

Utah Department of Natural Resources
Division of Wildlife Resources
1594 West North Temple
Salt Lake City, Utah 84114

Wyoming Game and Fish Commission
5400 Bishop Boulevard
Cheyenne, Wyoming 82006

Idaho Department of Fish and Game
600 S. Walnut Street
P.O. Box 25
Boise, Idaho 83707

Nevada Department of Wildlife
1100 Valley Road
Reno, Nevada 89512

Fish and Wildlife Service
Utah Field Office
2369 West Orton Circle, Suite 50
West Valley City, Utah 84119

Bureau of Land Management
Utah State Office
P.O. Box 45155
Salt Lake City, Utah 84145

Bureau of Land Management
Wyoming State Office
P.O. Box 1828
Cheyenne, Wyoming 82003

Bureau of Land Management
Idaho State Office
1387 South Vinnell Way
Boise, Idaho 83709

Bureau of Land Management
Nevada State Office
1340 Financial Boulevard
Reno, Nevada 89502

National Park Service, Grand Teton National Park
P.O. Drawer 170
Moose, Wyoming 83012-0171

United States Bureau of Reclamation
Provo Area Office
302 East 1860 South
Provo, Utah 84606

United States Forest Service Intermountain Region
Uinta-Wasatch-Cache, Bridger-Teton, Sawtooth, and Caribou-Targhee
National Forests
324 25th Street
Ogden, Utah 84401

Trout Unlimited
Bear River Native Trout Program / Utah Water Project
180 South Main Street
Providence, Utah 84332

The Nature Conservancy
559 East South Temple
Salt Lake City, Utah 84102

Separate Memorandum(a) of Understanding and Cooperative Agreements will be developed with additional parties as necessary to ensure implementation of specific conservation measures.

Northern leatherside distribution includes portions of Utah, Idaho, Wyoming, and Nevada. Signatories to this Agreement will cooperate with management agencies in all states where northern leatherside occurs whenever necessary and prudent.

III. AUTHORITY

The signatory parties hereto enter into this Agreement and the attached Conservation Strategy under Federal law, as applicable, including, but not limited to: Title 43, Section 24.6 of the Code of Federal Regulations, which states that "by reason of the Congressional policy (e.g., Fish and Wildlife Coordination Act of 1956) of State-Federal cooperation and coordination in the area of fish and wildlife conservation, State and Federal agencies have implemented cooperative agreements for a variety of fish and wildlife programs on Federal Lands." State law, as applicable: under Title 23 Chapter 22.1 of the Utah Code stating that the "Division of Wildlife Resources may enter into cooperative agreements and programs with other state agencies, federal agencies, states, educational institutions, municipalities, counties, corporations, organized clubs, landowners, associations, and individuals for purposes of wildlife conservation." Idaho Code Section 36-104(b)(9) authorizes the Idaho Department of Fish and Game to "enter into cooperative agreements with state and federal agencies, municipalities, corporations, organized groups of landowners, associations, and individuals for the development of wildlife rearing, propagating, management, protection and demonstration projects." The Wyoming Game and Fish Commission has the authority to enter into this Agreement pursuant to the provisions of Wyoming Statute 23-1-302(a)(x)-(xii).

All parties to this Agreement recognize that they each have specific statutory responsibilities with respect to the management and conservation of wildlife, and its habitat. Nothing in this Agreement or the Strategy is intended to abrogate any of the parties' respective responsibilities.

This Agreement is subject to and is intended to be consistent with all applicable Federal and State laws and interstate compacts.

IV. STATUS OF NORTHERN LEATHERSIDE

Leatherside chub are small cyprinid fishes that occur in mid-elevation desert streams throughout the Bonneville Basin and in select parts of the upper Snake River drainage of western North America. Recent evidence indicates that leatherside chub (traditionally referred to as *Gila copei* or *Snyderichthys copei*) is composed of two distinct taxa, the northern leatherside (*Lepidomeda copei*) and the southern leatherside (*Lepidomeda aliciae*; Johnson et al. 2004). The northern leatherside occurs in the Bear River and Snake River drainages in Utah, Idaho, Nevada, and Wyoming.

The northern leatherside was petitioned for listing under ESA by the Forest Guardians in 2007 (Forest Guardians 2007). This petition was based off of NatureServe data giving northern leatherside a status of G1G2 indicating the population is either critically imperiled or imperiled. We anticipate that the Service will conduct a 12 month status review for northern leatherside in 2009.

Federal and state management agencies in Utah, Idaho, and Wyoming recognize the northern leatherside as a "species of concern" or "Protected Nongame Fish" that warrants special management and conservation planning considerations (UDWR 2005, IDFG 2005, WGFD 2005). Monitoring efforts and surveys have identified that populations are declining relative to historical levels, primarily caused by habitat fragmentation. Much of the current fragmentation that populations experience is anthropogenic, caused by factors including irrigation projects, water diversion, habitat degradation, and the introduction of non-native fish predators. Close examination of museum records identify a number of sites where populations once existed, but now appear to be extirpated (Wilson 1996, Wilson and Belk 1996, Wilson and Belk 2001, Johnson et al. 2004). Little is known about the status and life history of northern leatherside and most of what is known has been learned in the past few years.

V. CONSERVATION ELEMENTS

The success of any conservation program depends on eliminating or reducing the impact of conditions or activities that threaten the species existence. For consistency, the general format is based on the five criteria considered for federal listing of a species in Section 4(a)(1) of the ESA. See Strategy for specific criteria page 31.

1. The present or threatened destruction, modification, or curtailment of its habitat or range.
2. Disease, predation, competition and hybridization.
3. Over-utilization for commercial, recreational, scientific, or educational purposes.
4. The inadequacy of existing regulatory mechanisms.
5. Other natural (e.g. drought) or human induced (e.g. socio-political) factors affecting its continued existence.

To meet the goal and objectives of this Agreement and to address ESA listing criteria, the following conservation elements must be implemented where possible:

A. Surveys – Inventory and describe current range of the species.
B. Habitat Enhancement - Enhance and/or restore habitat conditions in designated areas throughout the historic range of northern leatherside.
C. Habitat Protection - Protect and enhance habitat (via land use changes) through land acquisition, conservation easements, or regulatory mechanisms.
D. Restore Hydrologic Conditions - Maintain, restore and/or augment natural hydrologic characteristics and water quality.
E. Nonnative Control - Selectively control nonnative species that negatively impact northern leatherside via predation and/or competition.

F. **Range Expansion -** Conduct surveys, life history, and genetic studies to determine habitat requirements for translocation of northern leatherside into historic areas.
G. **Monitoring -** Monitoring goals seek to detect changes in population distribution over time.
H. **Regulation -** Maintain and enforce state regulations that prohibit the collection, possession, and transportation of northern leatherside.
I. **Disease Management -** Determine the extent of infection in populations, monitor effects of pathogenic infection and prevent further infection by implementing biosecurity protocols.
J. **Information and Education -** Increase public awareness and support for the conservation of northern leatherside.

VI. CONSERVATION SCHEDULE AND ASSESSMENT

Four general administrative actions, as outlined below, will be implemented.

Coordinating Conservation Activities

The Northern Leatherside Conservation Team (NLCT) will consist of a designated representative from signatories to this Agreement. The NLCT will consult with technical experts, legal advisors, and other interested parties as necessary.

The areas of concern covered by this Agreement are located in Utah, Idaho, Wyoming, and Nevada. Leadership of the NLCT will rotate among representatives of each of the participating State fish and wildlife management agencies (UDWR, IDFG, WGFC, NDOW).

Authority of the NLCT shall be limited to making recommendations for the conservation of the northern leatherside. These recommendations will be implemented by Team members, subject to review by the agencies' Directors or Bureau Chiefs for ecosystem conflict and/or opportunities for ecosystem-level or multi-species collaborative conservation. The Director or Bureau Chief will provide copies of comments, recommendations, and actions to the signatories and to other interested parties upon request.

The NLCT will meet annually, to provide a summary of conservation actions completed and in progress, develop priorities for the coming year, evaluate funding opportunities with partner members, and receive reports on progress and effectiveness of the Strategy implementation.

NLCT meetings will be open to interested parties. Minutes of the meetings and progress reports will be distributed to the NLCT and can be distributed to technical advisors and to other interested parties upon request.

The NLCT shall operate by consensus of the signatories when determining management recommendations concerning northern leatherside protection and conservation. If

consensus is not achieved, agency Directors or Bureau Chiefs will resolve and determine how to proceed.

Implementing Conservation Schedule

The leader of the NLCT will coordinate conservation activities and monitor conservation actions conducted by participants in accordance with this Agreement and Strategy. Conservation actions will be scheduled and cooperatively reviewed on an annual basis by the signatories.

Funding Conservation Actions

Funding for this Agreement and Strategy will be provided by a variety of sources. Federal, State, and local sources will need to provide or secure funding to initiate procedures and tasks of the Agreement and Strategy.

It is understood that all funds required for and expended in accordance with this Agreement are subject to approval by the appropriate local, State, or Federal appropriations. This instrument is neither a fiscal nor a funds obligation document.

Conservation Progress Assessment

An annual assessment of conservation activities, accomplishments and subsequent yearly schedules will be made by the NLCT. This assessment will be based on updates and evaluations by NLCT members. This assessment will determine the effectiveness of this agreement and whether revisions are warranted. The assessment will be provided to the states and respective Directors or Bureau Chiefs by the NLCT.

If threats to the survival of the northern leatherside become known that are not or cannot be resolved through this or any Conservation Agreement, the NLCT will immediately notify all signatories.

VII. DURATION OF AGREEMENT

The initial term of this Agreement shall be ten years. Prior to the end of each five-year period, a thorough assessment of actions implemented for the species will be conducted by the NLCT. If at the end of ten years, all signatories agree that sufficient progress has been made towards the conservation and recovery of the northern leatherside, this Agreement shall be extended for an additional five years. Any party may withdraw from this Agreement on ninety days written notice to the other parties.

VIII. NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) COMPLIANCE

The Agreement and Strategy are being developed for planning purposes. Before any projects with a federal nexus, which may impact the natural or human environment, are scheduled for implementation they will be reviewed for the potential to require NEPA compliance (e.g. completion of an Environmental Assessment). Federal signatories to the Agreement will be consulted on any projects with the potential to require NEPA review and compliance.

IX. FEDERAL AND STATE AGENCY COMPLIANCE

During the performance of this agreement, the participants agree to abide by the terms of Executive Order 11246 on non-discrimination and will not discriminate against any person because of race, color, religion, sex or national origin.

No member or delegate to Congress or resident Commissioner shall be admitted to any share or part of this agreement, or to any benefit that may arise there from, but this provision shall not be construed to extend to this agreement if made with a corporation for its general benefit.

All activities and programs conducted under this Agreement shall be subject to and conform to all applicable State and Federal laws.

X. LITERATURE CITED

Forest Guardians. 2007. A Petition to List 206 Critically Imperiled or Imperiled Species in the Mountain-Prairie Region of the United States as Threatened or Endangered Under the Endangered Species Act, 16 U.S.C. 1531 et seq. Prepared by N. J Rosmarino and J. J. Tutchton. Santa Fe, New Mexico.

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Johnson, J. B., T. E. Dowling, and M. C. Belk. 2004. Neglected taxonomy of rare desert fishes: congruent evidence for two species of leatherside chub. Systematic Biology 53(6):841-845.

Utah Division of Wildlife Resources. 2005. Utah Comprehensive Wildlife Conservation Strategy (CWCS). Prepared by Janet V. Gorrell, Matthew E. Andersen, Kevin D. Bunnell, Michael F. Canning, Alan G. Clark, Dana E. Dolsen, Frank P. Howe. Publication Number 05-19. , 1594 West North Temple, Salt Lake City, Utah 84114-6301. http://www.wildlife.utah.gov/cwcs/.

Wilson, K. W. 1996. Habitat characteristics of leatherside chub (*Gila copei*) at two spatial scales. Department of Zoology, Brigham Young University, Provo, Utah. 35 pp.

Wilson, K. W. and M. C. Belk. 2001. Habitat characteristics of leatherside chub (*Gila copei*) at two spatial scales. Western North American Naturalist 61:36-42.

Wilson, K. W. and M. C. Belk. 1996. Current distribution and habitat use of leatherside chub (*Gila copei*) in the Sevier and Beaver River drainages in south central Utah. Final Report to Utah Division of Wildlife Resources, Salt Lake City, Utah. Contract Number No. 93-0870. Unpublished manuscript, 24 pp.

Wyoming Game and Fish Department. 2005. A Comprehensive Wildlife Conservation Strategy for Wyoming. Wyoming Game and Fish Department, Cheyenne, Wyoming. http://gf.state.wy.us/wildlife/CompConvStrategy/index.asp.

XI. SIGNATORIES

The following pages include separate agreement pages for each signatory.

NORTHERN LEATHERSIDE
CONSERVATION AGREEMENT
UTAH DIVISION OF WILDLIFE RESOURCES

The Utah Division of Wildlife Resources (Division) hereby states its intent and commitment to assist with, participate in, and lead the implementation of the Northern Leatherside Conservation Agreement and Strategy, as prepared by the Northern Leatherside Conservation Team. Specific commitments made are as follows:

1. To provide a representative to the Northern Leatherside Conservation Team, which is made up of representatives from various agencies listed in the Agreement, to implement conservation elements described in the Strategy.

2. To assume lead responsibility for the inventory and monitoring of northern leatherside populations in the State of Utah and to annually compile and report inventory and monitoring information and provide such information to all participating agencies and parties.

3. To make recommendations to the U.S. Army Corp of Engineers regarding the issuance of 404 permits for any land development proposals that would negatively impact key northern leatherside habitats, and to work cooperatively with private land owners, land developers, and local land use planners in Utah to avoid, minimize and/or mitigate negative impacts of land development on northern leatherside habitat.

4. To implement and enforce specific State statutes and Wildlife Codes (Wildlife Resources Code of Utah) that protects and prohibits the collection and/or importation of threatened, endangered and special concern species, including northern leatherside.

5. To continue to conduct and support research to collect information on biotic and abiotic limiting factors of northern leatherside populations, habitat and ecology and to work to reduce or eliminate limiting factors.

Performance of activities above is contingent on adequate funds being made available and allocated to the Division. This Agreement shall not prohibit the Division from engaging in management actions regarding northern leatherside conservation beyond those described in this Agreement and Strategy. Such management actions will be coordinated with the Northern Leatherside Conservation Team and other appropriate parties as deemed necessary.

This Agreement shall become effective on the date of signature by the Division, and shall remain in effect until the Division chooses to withdraw from the Agreement in whole or in part, or the Agreement is terminated by consent of the Northern Leatherside Conservation Team. Either the Division or the Northern Leatherside Conservation Team may terminate the Agreement by providing 90 days written notification to the other party.

By signing this document below, the Division acknowledges that it is also signing as a party and participant to the whole of the Northern Leatherside Conservation Agreement and Strategy attached hereto.

ACTING DIRECTOR

Jim F. Karpowitz, Director
Utah Division of Wildlife Resources
Utah Department of Natural Resources

5/21/09
Date

NORTHERN LEATHERSIDE
CONSERVATION AGREEMENT
IDAHO DEPARTMENT OF FISH AND GAME

The Idaho Department of Fish and Game (IDFG) hereby states its intent and commitment to assist with, participate in, and implement the Northern Leatherside Conservation Agreement and Strategy, as prepared by the Northern Leatherside Conservation Team. Specific commitments made are as follows:

1. To provide a representative to the Northern Leatherside Conservation Team, which is made up of representatives from various agencies listed in the Agreement, to implement conservation elements described in the Strategy.

2. To assume responsibility for the inventory and monitoring of northern leatherside populations in the State of Idaho and to annually compile and report inventory and monitoring information and provide such information to all participating agencies and parties.

3. To make recommendations to the U.S. Army Corp of Engineers regarding the issuance of 404 permits for any land development proposals that would negatively impact key northern leatherside habitats, and to work cooperatively with private land owners, land developers, and local land use planners in Idaho to avoid, minimize and/or mitigate negative impacts of land development on northern leatherside habitat.

4. To implement and enforce specific State statutes and fish and game codes (Fish and Game Code of Idaho) that protects and prohibits the collection and/or importation of threatened, endangered and protected species, including northern leatherside.

5. To continue to conduct and support research to collect information on biotic and abiotic limiting factors of northern leatherside populations, habitat and ecology and to work to reduce or eliminate limiting factors.

Performance of activities above is contingent on adequate funds being made available and allocated to the IDFG. This Agreement shall not prohibit the IDFG from engaging in management actions regarding northern leatherside conservation beyond those described in this Agreement and Strategy. Such management actions will be coordinated with the Northern Leatherside Conservation Team and other appropriate parties as deemed necessary.

This Agreement shall become effective on the date of signature by the IDFG, and shall remain in effect until the IDFG chooses to withdraw from the Agreement in whole or in part, or the Agreement is terminated by consent of the Northern Leatherside Conservation Team. Either the IDFG or the Northern Leatherside Conservation Team may terminate the Agreement by providing 90 days written notification to the other party.

By signing this document below, the IDFG acknowledges that it is also signing as a party and participant to the whole of the Northern Leatherside Conservation Agreement and Strategy attached hereto.

Cal Groen — 4/22/09

Cal Groen, Director
Idaho Department of Fish and Game

Date

NORTHERN LEATHERSIDE
CONSERVATION AGREEMENT
WYOMING GAME AND FISH COMMISSION

The Wyoming Game and Fish Commission (WGFC) hereby states its intent and commitment to assist with, participate in, and implement the Northern Leatherside Conservation Agreement and Strategy, as prepared by the Northern Leatherside Conservation Team (NLCT). Specific commitments made are as follows:

1. To provide a representative to the NLCT, which is made up of representatives from various agencies listed in the Agreement, to implement conservation elements described in the Strategy.
2. To assume responsibility for the inventory and monitoring of northern leatherside populations in the State of Wyoming and to annually compile and report inventory and monitoring information and provide such information to the NLCT.
3. To continue to conduct and support research to collect information on biotic and abiotic limiting factors of northern leatherside populations, habitat and ecology and to work to reduce or eliminate limiting factors.

Performance of activities above is contingent on adequate funds being made available and allocated to the WGFC. This Agreement shall not prohibit the WGFC from engaging in management actions regarding northern leatherside conservation beyond those described in this Agreement and Strategy. Such management actions will be coordinated with the NLCT and other appropriate parties as deemed necessary.

The State of Wyoming and the Commission do not waive sovereign immunity by entering into this Agreement, and specifically retain immunity and all defenses available to them as sovereigns pursuant to Wyoming Statute 1-39-104(a) and all other state laws.

The parties do not intend to create in any other individual or entity the status of third party beneficiary, and this Agreement shall not be construed so as to create such status. The rights, duties and obligations contained in this Agreement shall operate only between the parties to this Agreement, and shall inure solely to the benefit of the parties to this Agreement. The provisions of this Agreement are intended only to assist the parties in determining and performing their obligations under this Agreement.

This Agreement shall become effective on the date of signature by the WGFC, and shall remain in effect until the WGFC chooses to withdraw from the Agreement in whole or in part, or the Agreement is terminated by consent of the NLCT. Either the WGFC or the NLCT may terminate the Agreement by providing 90 days written notification to the other party.

By signing this document below, the WGFC acknowledges that it is also signing as a party and participant to the whole of the Northern Leatherside Conservation Agreement and Strategy attached hereto.

STATE OF WYOMING
WYOMING GAME AND FISH COMMISSION

Steve Ferrell — 4/20/09

Steve Ferrell, Director — Date
Wyoming Game and Fish Department

ATTORNEY GENERAL'S OFFICE APPROVAL AS TO FORM

C. Levi Martin — 4/9/09

Levi Martin, — Date
Wyoming Attorney Generals Representative

NORTHERN LEATHERSIDE
CONSERVATION AGREEMENT
NEVADA DEPARTMENT OF WILDLIFE

The Nevada Department of Wildlife (NDOW) hereby states its intent and commitment to assist with, participate in, and implement the Northern Leatherside Conservation Agreement and Strategy, as prepared by the Northern Leatherside Conservation Team. Specific commitments made are as follows:

1. To provide a representative to the Northern Leatherside Conservation Team, which is made up of representatives from various agencies listed in the Agreement, to implement conservation elements described in the Strategy.

2. To assume responsibility for the inventory and monitoring of northern leatherside populations in the State of Nevada and to annually compile and report inventory and monitoring information and provide such information to all participating agencies and parties.

3. To make recommendations to the U.S. Army Corp of Engineers regarding the issuance of 404 permits for any land development proposals that would negatively impact key northern leatherside habitats, and to work cooperatively with private land owners, land developers, and local land use planners in Nevada to avoid, minimize and/or mitigate negative impacts of land development on northern leatherside habitat.

4. To implement and enforce specific State statutes and fish and wildlife codes (Nevada Administrative Code) that protects and prohibits the collection and/or importation of threatened, endangered and protected species, including northern leatherside.

5. To continue to conduct and support research to collect information on biotic and abiotic limiting factors of northern leatherside populations, habitat and ecology and to work to reduce or eliminate limiting factors.

Performance of activities above is contingent on adequate funds being made available and allocated to the NDOW. This Agreement shall not prohibit the NDOW from engaging in management actions regarding northern leatherside conservation beyond those described in this Agreement and Strategy. Such management actions will be coordinated with the Northern Leatherside Conservation Team and other appropriate parties as deemed necessary.

This Agreement shall become effective on the date of signature by the NDOW, and shall remain in effect until the NDOW chooses to withdraw from the Agreement in whole or in part, or the Agreement is terminated by consent of the Northern Leatherside Conservation Team. Either the NDOW or the Northern Leatherside Conservation Team may terminate the Agreement by providing 90 days written notification to the other party.

By signing this document below, the NDOW acknowledges that it is also signing as a party and participant to the whole of the Northern Leatherside Conservation Agreement and Strategy attached hereto.

Kenneth E. Mayer — 2/3/09

Kenneth E. Mayer, Director
Nevada Department of Wildlife

Date

NORTHERN LEATHERSIDE
CONSERVATION AGREEMENT
US BUREAU OF LAND MANAGEMENT (Utah)

The U.S. Bureau of Land Management (BLM) hereby states its intent and commitment to assist with and participate in the implementation of the Northern Leatherside Conservation Agreement and Strategy as prepared by the interagency Northern Leatherside Conservation Team. Specific commitments made hereby are as follows:

1. To provide a representative to the Northern Leatherside Conservation Team, which will be made up of representatives from various agencies, as described in the Conservation Agreement.

2. To conduct a review of BLM lands in Utah which may occur within the historic range of the northern leatherside, and determine if any such lands contain suitable habitat for northern leatherside.

3. If northern leatherside or suitable northern leatherside habitats are found on BLM lands, work in cooperation with the Utah Division of Wildlife Resources to complete survey and monitoring of northern leatherside populations and/or to evaluate habitat condition.

4. To maintain and improve habitat and populations of the northern leatherside through adaptive management and mitigation on BLM lands. Authority for the protection of the northern leatherside and its habitat is pursuant to provisions in the BLM Policy Manual and the Federal Land Policy and Management Act.

Performance of all activities described above is contingent on adequate funds being made available and allocated to the BLM. This Agreement shall not prohibit the BLM from engaging in management actions regarding northern leatherside conservation beyond those described in this Agreement and Strategy. Such management actions will be coordinated with the Northern Leatherside Conservation Team and other appropriate parties as deemed necessary.

This Agreement shall become effective on the date of signature by the BLM, and shall remain in effect until the BLM chooses to withdraw from the Agreement in whole or in part, or the Agreement is terminated by consent of the Northern Leatherside Conservation Team. Either the BLM or the Northern Leatherside Conservation Team may terminate the Agreement by providing 90 days written notification to the other party.

By signing this document below, the BLM acknowledges that it is also signing as a party and participant to the whole of the Northern Leatherside Conservation Agreement and Strategy attached hereto.

Selma Sierra, Utah State Director ACTING
U.S. Bureau of Land Management, USDI

5/18/09
Date

NORTHERN LEATHERSIDE
CONSERVATION AGREEMENT
US BUREAU OF LAND MANAGEMENT (Idaho)

The U.S. Bureau of Land Management (BLM) hereby states its intent and commitment to assist with and participate in the implementation of the Northern Leatherside Conservation Agreement and Strategy as prepared by the interagency Northern Leatherside Conservation Team. Specific commitments made hereby are as follows:

1. To provide a representative to the Northern Leatherside Conservation Team, which will be made up of representatives from various agencies, as described in the Conservation Agreement.

2. To conduct a review of BLM lands in Idaho which may occur within the historic range of the northern leatherside, and determine if any such lands contain suitable habitat for northern leatherside.

3. If northern leatherside or suitable northern leatherside habitats are found on BLM lands, work in cooperation with the Idaho Department of Fish and Game to complete survey and monitoring of northern leatherside populations and/or to evaluate habitat condition.

4. To maintain and improve habitat and populations of the northern leatherside through adaptive management and mitigation on BLM lands. Authority for the protection of the northern leatherside and its habitat is pursuant to provisions in the BLM Policy Manual and the Federal Land Policy and Management Act.

Performance of all activities described above is contingent on adequate funds being made available and allocated to the BLM. This Agreement shall not prohibit the BLM from engaging in management actions regarding northern leatherside conservation beyond those described in this Agreement and Strategy. Such management actions will be coordinated with the Northern Leatherside Conservation Team and other appropriate parties as deemed necessary.

This Agreement shall become effective on the date of signature by the BLM, and shall remain in effect until the BLM chooses to withdraw from the Agreement in whole or in part, or the Agreement is terminated by consent of the Northern Leatherside Conservation Team. Either the BLM or the Northern Leatherside Conservation Team may terminate the Agreement by providing 90 days written notification to the other party.

By signing this document below, the BLM acknowledges that it is also signing as a party and participant to the whole of the Northern Leatherside Conservation Agreement and Strategy attached hereto.

Tom Dyer
Tom Dyer, Idaho State Director
U.S. Bureau of Land Management, USDI

4/24/09
Date

NORTHERN LEATHERSIDE
CONSERVATION AGREEMENT
US BUREAU OF LAND MANAGEMENT (Nevada)

The U.S. Bureau of Land Management (BLM) hereby states its intent and commitment to assist with and participate in the implementation of the Northern Leatherside Conservation Agreement and Strategy as prepared by the interagency Northern Leatherside Conservation Team. Specific commitments made hereby are as follows:

1. To provide a representative to the Northern Leatherside Conservation Team, which will be made up of representatives from various agencies, as described in the Conservation Agreement.

2. To conduct a review of BLM lands in Nevada which may occur within the historic range of the northern leatherside, and determine if any such lands contain suitable habitat for northern leatherside.

3. If northern leatherside or suitable northern leatherside habitats are found on BLM lands, work in cooperation with the Nevada Department of Wildlife to complete survey and monitoring of northern leatherside populations and/or to evaluate habitat condition.

4. To maintain and improve habitat and populations of the northern leatherside through adaptive management and mitigation on BLM lands. Authority for the protection of the northern leatherside and its habitat is pursuant to provisions in the BLM Policy Manuals and the Federal Land Policy and Management Act.

Performance of all activities described above is contingent on adequate funds being made available and allocated to the BLM. This Agreement shall not prohibit the BLM from engaging in management actions regarding northern leatherside conservation beyond those described in this Agreement and Strategy. Such management actions will be coordinated with the Northern Leatherside Conservation Team and other appropriate parties as deemed necessary.

This Agreement shall become effective on the date of signature by the BLM, and shall remain in effect until the BLM chooses to withdraw from the Agreement in whole or in part, or the Agreement is terminated by consent of the Northern Leatherside Conservation Team. Either the BLM or the Northern Leatherside Conservation Team may terminate the Agreement by providing 90 days written notification to the other party.

By signing this document below, the BLM acknowledges that it is also signing as a party and participant to the whole of the Northern Leatherside Conservation Agreement and Strategy attached hereto.

Ron Wenker

Ron Wenker, Nevada State Director
U.S. Bureau of Land Management, USDI

May 7, 2009
Date

NORTHERN LEATHERSIDE
CONSERVATION AGREEMENT
US BUREAU OF LAND MANAGEMENT (Wyoming)

The U.S. Bureau of Land Management (BLM) herby states its intent and commitment to assist with and participate in the implementation of the Northern Leatherside Conservation Agreement and Strategy as prepared by the interagency Northern Leatherside Conservation Team. Specific commitments made hereby are as follows:

1. To provide a representative to the Northern Leatherside Conservation Team, which will be made up of representatives from various agencies, as described in the Conservation Agreement.

2. To conduct a review of BLM lands in Wyoming which may occur within the historic range of the northern leatherside, and determine if any such lands contain suitable habitat for northern leatherside.

3. If northern leatherside or suitable northern leatherside habitats are found on BLM lands, work in cooperation with the Wyoming Department of Game and Fish to complete survey and monitoring of northern leatherside populations and/or to evaluate habitat condition.

4. To maintain and improve habitat and populations of the northern leatherside through adaptive management and mitigation on BLM lands. Authority for the protection of the northern leatherside and its habitat is pursuant to provisions in the BLM Policy Manual and the Federal Land Policy and Management Act.

Performance of all activities described above is contingent on adequate funds being made available and allocated to the BLM. This Agreement shall not prohibit the BLM from engaging in management actions regarding northern leatherside conservation beyond those described in this Agreement and Strategy. Such management actions will be coordinated with the Northern Leatherside Conservation Team and other appropriate parties as deemed necessary.

This Agreement shall become effective on the date of signature by the BLM, and shall remain in effect until the BLM chooses to withdraw from the Agreement in whole or in part, or the Agreement is terminated by consent of the Northern Leatherside Conservation Team. Either the BLM or the Northern Leatherside Conservation Team may terminate the Agreement by providing 90 days written notification to the other party.

By signing this document below, the BLM acknowledges that it is also signing as a party and participant to the whole of the Northern Leatherside Conservation Agreement and Strategy attached hereto.

Don Simpson, Wyoming State Director
U.S. Bureau of Land Management, USDI

4/10/09
Date

NORTHERN LEATHERSIDE
CONSERVATION AGREEMENT
US FOREST SERVICE

The U.S.D.A. Forest Service, Intermountain Region (USFS), and the Bridger-Teton, Caribou-Targhee, Sawtooth, and Uinta-Wasatch-Cache National Forests, hereby state their intent and commitment to assist with and participate in the implementation of the Northern Leatherside Conservation Agreement and Strategy for the management and recovery of northern leatherside populations, as prepared by the interagency Northern Leatherside Conservation Team. Specific commitments made hereby are as follows:

1. To provide a representative from each forest to the Northern Leatherside Conservation Team, which will be made up of representatives from various agencies, groups, and individuals, as described in the Strategy.

2. To work in cooperation with the Northern Leatherside Conservation Team and the Utah Division of Wildlife Resources, Wyoming Game and Fish, and Idaho Fish and Game to conduct surveys for northern leatherside chub in historic and suitable habitats on the National Forests, and to assist with regular status assessments of any known populations on these Forests.

3. To consider possible impacts (both positive and negative) of land management actions on the northern leatherside chub and its habitat within its historic range. To identify and take measures to avoid and/or mitigate such impacts, if thought to be detrimental, whenever possible within constraints of Forest Service policy, regulations, and plans.

Performance of all activities described above is contingent upon the annual receipt of adequate funding. This agreement shall not prohibit the USFS from engaging in management actions regarding northern leatherside conservation beyond those described in this Agreement and Strategy. Such management actions should be coordinated with the Northern Leatherside Conservation Team.

This Agreement shall become effective on the date of signature by the USFS, and shall remain in effect until the USFS chooses to withdraw from the Agreement in whole or in part, or the Agreement is terminated by consent of the Northern Leatherside Conservation Team. Either the USFS or the Northern Leatherside Conservation Team may terminate the Agreement by providing 90 days written notification to the other party.

The U. S. Forest Service, Intermountain Region, is granted authority to enter into this commitment through the National Forest Management Act of 1976 and the Sikes Act of 1960.

By signing this document below, the Forest Service acknowledges that it is also signing as a party and participant to the whole of the Northern Leatherside Conservation Agreement and Strategy attached hereto.

Harv Forsgren — 3/16/2009

Harvey Forsgren, Regional Forester — Date
USDA Forest Service, Intermountain Region

NORTHERN LEATHERSIDE CONSERVATION AGREEMENT
Trout Unlimited

Trout Unlimited (TU) hereby states its intent and commitment to assist with and participate in the implementation of the Northern Leatherside Conservation Agreement and Strategy for the management and recovery of northern leatherside populations, as prepared by the interagency Northern Leatherside Conservation Team. Specific commitments made hereby are as follows:

1. To provide a representative to the Northern Leatherside Conservation Team, which will be made up of representatives from various agencies, groups, and individuals, as described in the Strategy.

2. To work in cooperation with the Northern Leatherside Conservation Team and the Utah Division of Wildlife Resources, Wyoming Game and Fish, Nevada Department of Wildlife, and Idaho Fish and Game to conduct surveys for northern leatherside in historic and suitable habitats, and to assist with regular status assessments of any known populations.

3. To provide pertinent research and restoration updates to the Northern Leatherside Conservation Team while coordinating these activities with all involved parties.

Performance of all activities described above is contingent upon the annual receipt of adequate funding. This agreement shall not prohibit TU from engaging in management actions regarding northern leatherside conservation beyond those described in this Agreement and Strategy. Such management actions should be coordinated with the Northern Leatherside Conservation Team.

This Agreement shall become effective on the date of signature by TU, and shall remain in effect until TU chooses to withdraw from the Agreement in whole or in part, or the Agreement is terminated by consent of the Northern Leatherside Conservation Team. Either TU or the Northern Leatherside Conservation Team may terminate the Agreement by providing 90 days written notification to the other party.

By signing this document below, Trout Unlimited acknowledges that it is also signing as a party and participant to the whole of the Northern Leatherside Conservation Agreement and Strategy attached hereto.

Kirk Dahle — 3/3/2009

Kirk Dahle
Utah coordinator, Bear River Native Trout Program

Date

NORTHERN LEATHERSIDE
CONSERVATION AGREEMENT
National Park Service (NPS)

The National Park Service (NPS) hereby enters into this agreement to assist with and participate in the implementation of the Northern Leatherside Conservation Agreement and Strategy as prepared by the interagency Northern Leatherside Conservation Team. Specific commitments made hereby are as follows:

1. To provide a representative to the Northern Leatherside Conservation Team, which will be made up of representatives from various agencies, as described in the Conservation Agreement.

2. To conduct a review of NPS lands which may occur within the historic range of the northern leatherside, and determine if any such lands contain suitable habitat for northern leatherside.

3. If northern leatherside or suitable northern leatherside habitats are found on NPS lands, work in cooperation with the Northern Leatherside Conservation Team to complete survey and monitoring of northern leatherside populations and/or to evaluate habitat condition.

4. To maintain and improve habitat and populations of the northern leatherside through adaptive management and mitigation on NPS lands. Authority for the protection of the northern leatherside and its habitat is pursuant to provisions in the NPS Policy Manual and the Federal Land Policy and Management Act.

Performance of all activities described above is contingent on adequate funds being available. This Agreement shall not prohibit the NPS from engaging in management actions regarding northern leatherside conservation beyond those described in this Agreement and Strategy. Such management actions will be coordinated with the Northern Leatherside Conservation Team and other appropriate parties as deemed necessary.

This Agreement shall become effective on the date of signature by the NPS, and shall remain in effect until the NPS chooses to withdraw from the Agreement in whole or in part, or the Agreement is terminated by consent of the Northern Leatherside Conservation Team. Either the NPS or the Northern Leatherside Conservation Team may terminate the Agreement by providing 90 days written notification to the other party.

The National Park Service is granted authority to enter into this conservation commitment through 43 CFR 24.6, the USDI fish and wildlife policy on state and federal relationships.

By signing this document below, the NPS acknowledges that it is also signing as a party and participant to the whole of the Northern Leatherside Conservation Agreement and Strategy attached hereto.

M L Scott — 4/22/09

Mary Gibson Scott — Date
Superintendent, Grand Teton National Park
National Park Service

NORTHERN LEATHERSIDE CHUB
CONSERVATION AGREEMENT
U.S. FISH AND WILDLIFE SERVICE

The U.S. Fish and Wildlife Service hereby states its intent and commitment to assist with and participate in the implementation of the Conservation Agreement and Strategy for the Management and Recovery of Northern Leatherside Chub (Agreement), as prepared by the interagency Northern Leatherside Chub Technical Team. The Service commits to the following:

1. To consider applications for funding to the Technical Team and/or involved states through the Endangered Species Act Section 6 or other grant programs for implementation of the Conservation Agreement and Strategy.

2. To provide a representative to the interagency Northern Leatherside Chub Technical Team.

3. To review and provide comments for any projects federally authorized, funded, or carried out that may impact the northern leatherside chub; under authority of the Fish and Wildlife Coordination Act, projects requiring a Clean Water Act Section 404 permit issued by the U.S. Army Corps of Engineers; and water developments proposed by the Bureau of Reclamation or private water development entities, regulated under the Federal Energy Regulatory Commission.

4. Coordinate and assist other Federal agencies to protect northern leatherside chub from impacts of land and water altering activities on Federal lands that may support northern leatherside chub.

Performance of all activities described above is contingent on adequate funds being made available and allocated to the signatory agency. This Agreement shall not prohibit the signatory agency from engaging in management actions regarding Northern leatherside chub conservation beyond those described in this Agreement and in the Strategy. Such management actions will be coordinated with the Northern Leatherside Chub Technical Team and other appropriate parties as deemed necessary.

This Agreement shall become effective on the date of signature by the participating party, and shall remain in effect until the signatory party withdraws from the Agreement in whole or in part, or the Agreement is terminated by consent of the Northern Leatherside Chub Technical Team. Either the signatory party or the Northern Leatherside Chub Technical Team may terminate the agreement by providing 90 days written notification to the other party.

By signing this document below, the Utah Division of Wildlife Resources acknowledges that it is also signing as a party and participant to the whole of the Agreement attached hereto.

L. Crist 5/11/09

Larry Crist, Field Supervivor
Utah Field Office
U.S. Fish & Wildlife Service, Region 6

Date

NORTHERN LEATHERSIDE
CONSERVATION AGREEMENT
U.S. BUREAU OF RECLAMATION

U.S. Bureau of Reclamation (Reclamation) hereby states its intent and commitment to assist with and participate in the implementation of the Northern Leatherside Conservation Agreement and Strategy as prepared by the Northern Leatherside Conservation Team. Specific commitments made hereby are as follows:

1. To provide a representative to the Northern Leatherside Conservation Team, consisting of representatives from various state and federal agencies, tribes, and local entities.

2. To work in cooperation with the Northern Leatherside Conservation Team and the cooperating State agencies to conduct surveys on Reclamation lands, to assist with monitoring of any breeding populations that may be found on Reclamation land, and to cooperate and assist in eradication/control of non-indigenous species.

3. To consider possible impacts of Reclamation management plans on northern leatherside and their habitat, and to take measures to avoid and/or mitigate such impacts whenever possible within the constraints of Reclamation policy and authority.

Performance of all activities described above is contingent on adequate funds being made available and allocated to Reclamation. This agreement shall not prohibit Reclamation from engaging in management actions regarding northern leatherside conservation beyond those described in this Agreement and Strategy. Such management actions will be coordinated with the Northern Leatherside Conservation Team and other appropriate parties as deemed necessary.

This Agreement shall become effective on the date of signature by Reclamation, and shall remain in effect until Reclamation chooses to withdraw from the Agreement in whole or in part, or the Agreement is terminated by consent of the Northern Leatherside Conservation Team. Either Reclamation or the Northern Leatherside Conservation Team may terminate the Agreement by providing 90 days written notification to the other party.

By signing this document below, Reclamation acknowledges that it is also signing as a party and participant to the whole of the Northern Leatherside Conservation Agreement and Strategy attached hereto.

Bruce C. Barrett, Area Manager
Provo Area Office
U.S. Bureau of Reclamation, USDI

May 1, 2009
Date

NORTHERN LEATHERSIDE
CONSERVATION AGREEMENT
THE NATURE CONSERVANCY

The Nature Conservancy (TNC) hereby states its intent and commitment to assist with and participate in the implementation of the Northern Leatherside Conservation Agreement and Strategy as prepared by the interagency Northern Leatherside Conservation Team. Specific commitments made hereby are as follows.

1. To provide one staff member as a contact to the Northern Leatherside Conservation Team, which is comprised of all signatory agencies.

Performance of all activities listed above is contingent upon the annual receipt of adequate funding. This commitment shall not prohibit the signatory agency from engaging in management actions regarding northern leatherside conservation beyond those described in this Agreement and Strategy. Such management actions should be coordinated with the Northern Leatherside Conservation Team and other appropriate parties as deemed necessary.

This commitment shall become effective on the date of signature by the participating party and shall remain in effect until the signatory party chooses to terminate the commitment or until the Northern Leatherside Conservation Team decides (by consensus) to terminate the plan. The signatory party will provide 90 days written notification to the other parties upon deciding to terminate involvement.

By signing the document below, TNC acknowledges that it is also signing as a party and participant to the whole of the Northern Leatherside Conservation Team attached hereto.

Dave Livermore, State Director
The Nature Conservancy in Utah

3/27/09
Date

RANGEWIDE CONSERVATION STRATEGY

FOR

NORTHERN LEATHERSIDE

(*Lepidomeda copei*)

INTRODUCTION

The northern leatherside (*Lepidomeda copei*: Cyprinidae, formerly referred to as leatherside chub *Gila copei* and *Snyderichthys copei*) is a small mid-elevation desert fish endemic to streams within the northeastern portions of the Bonneville Basin and select drainages of the upper Snake River of Western North America (Johnson and Jordan 2000). Within this historical range, populations are declining relative to historical observations. Close examination of museum records identify a number of sites where populations once existed, but now appear to be extirpated (Wilson 1996, Wilson and Belk 1996b, Wilson and Belk 2001, Johnson et al. 2004).

Recent evidence also indicates that northern leatherside is one of two taxa formerly known as leatherside chub and qualifies as a unique species (Johnson and Jordan 2000, Dowling et al. 2002, Belk et al. 2005, Johnson et al. 2004). In the recent past, the need for conservation actions to address the decline of leatherside chub was evaluated for the entire historical range of leatherside chub. Conservation needs will now be assessed for each species within their range. This change in assessment may highlight an increased need for conservation actions for northern leatherside. In light of these developments, state management agencies in Utah, Idaho, and Wyoming all recognize northern leatherside as a "species of concern" (or equivalent status) that warrants special consideration in terms of management and conservation planning (UDWR 2005, IDFG 2005, WGFD 2005).

This conservation strategy has been developed to identify and expedite implementation of conservation measures for northern leatherside with the desired outcome of ensuring the long-term conservation of northern leatherside within its historical range. Conservation actions are needed to identify current distribution within historical range, reduce threats, identify and implement research needs, and maintain and restore habitat complexity where possible. Actions described in this plan are intended to stabilize existing populations and reduce or eliminate the potential for further species declines by removing or reducing threats within known historical northern leatherside range.

TAXONOMIC STATUS

The type locality account for northern leatherside, (*Squalius copei*; Jordan and Gilbert 1881), is from the Bear River at Evanston, Wyoming. Since 1881 leatherside chub have been assigned and subsequently removed from different genera multiple times (Lee et al.

1981, Johnson et al. 2004). Within this taxonomic history, Miller (1945) placed leatherside chub in the monotypic genus *Snyderichthys*, and then Uyeno (1960) relegated it to the genus *Gila*, subgenus *Snyderichthys*. Many (e.g., Lee et al. 1981, Robins et al. 1991, Sigler and Sigler 1996, Johnson and Jordan 2000, Wilson and Belk 2001, Johnson et al. 2004) have followed Uyeno's (1960) recommendation of *Gila copei*. The recent taxonomy accepted by the American Fisheries Society (Nelson et al. 2004) is supported by the efforts of Simons and Myden (1997), and along with Dowling et al. (2002), follows Miller's (1945) example of *Snyderichthys copei*.

Recent research indicates leatherside chub is composed of two distinct species neither of which follows the current taxonomy. Genetic analysis by Johnson and Jordan (2000), Dowling et al. (2002), and Johnson et al. (2004) support two evolutionary distinct species of leatherside chub. These species consist of the northern leatherside located in the Snake River and Bear River drainages and the southern leatherside (*Lepidomeda aliciae*) located in the Utah Lake and Sevier River drainages. Results show both species to be related to the plagoptrins (*Meda*, *Lepidomeda*, and *Plegopterus;* Coburn and Cavender 1992) with northern leatherside more closely related to other *Lepidomeda* species than to southern leatherside (Johnson and Jordan 2000, Dowling et al 2002, Johnson et al. 2004).

In addition to the phylogenetic species concept model, Johnson et al. (2004) also used the similarity and ecological species concept models to support the separation of leatherside chub into two species. Cranial shapes of individuals from the northern leatherside differ significantly from those of the southern leatherside supporting two species under the similarity species concept model. Significantly different growth and foraging rates at different temperatures for individuals from northern and southern leatherside support the separation of leatherside chub into two species under the ecological species concept model (Johnson et al. 2004). This study is compelling because it uses multiple lines of evidence to arrive at a shared result, that the geographically distinct populations of leatherside chub are more accurately described as two species.

Evolutionary events associated with the current mix of species and distributions are still unclear. The distribution of the northern and southern leatherside may coincide with the hydrologic events associated with Lake Bonneville during the Pleistocene (Smith 1978). Leatherside chub may have expanded from the Bonneville Basin into the upper Snake River approximately 14,500 years ago (Jarrett and Malde 1987). An alternate hypothesis is movement of leatherside chub from the upper Snake River through the Bonneville Basin, to the pluvial White River of Nevada and into the Colorado River (Dowling et al. 2002).

DESCRIPTION AND ECOLOGY

Species Description

With the division of leatherside chub into two taxa, descriptions for northern and southern leatherside may vary slightly. At this time, the general description is an amalgamation of traits that apply to both northern and southern leatherside. Characteristics prevalent in both species include the leathery appearance created by very

small scales on a trim, tapering body, rounded dorsal and anal fins, and the origin of the dorsal fin behind the insertion of the pelvic fins. The average length of northern and southern leatherside varies between 76 to 127 mm (152 mm maximum length). Meristic characteristics typically include eight rays in the dorsal and anal fins, 75 to 85 lateral line scales, and two rows of pharyngeal teeth usually numbering 2, 4-4, 2. Typically, the body color of both sexes is bluish above and silver below. During the spawning season, males and females have additional golden-red coloring at the upper end of the gill opening and between the eye and upper jaw. Males also have orange to red coloring on the axils of the paired fins, on the base of the anal fin, and on the lower lobe of the caudal fin (Sigler and Miller 1963, Sigler and Sigler 1987, Sigler and Sigler 1996).

At least two characteristics distinguish northern leatherside from the southern leatherside: cranial shape and size-at-age. Northern leatherside have deeper heads with shorter snouts than southern leatherside (Johnson et al. 2004). Body sizes of northern leatherside are about 15% smaller than southern leatherside at a given age (Belk et al. 2005). Future investigations may find additional species trait differences between northern and southern leatherside.

Life History Traits

Before 1995 very little was known about the life history traits of leatherside chub (Johnson et al. 1995). Life expectancy was thought to be less than five years and spawning occurred sometime between June and August (Sigler and Miller 1963, Sigler and Sigler 1987, Johnson et al. 1995, Sigler and Sigler 1996). Studies have increased our knowledge since that time, but specific traits belonging to northern and southern leatherside have not been delineated. Current knowledge of leatherside chub life history traits is attributed to both species.

Johnson et al. (1995) determined the maximum life span of the southern leatherside to be at least eight years. Growth rate for both species is rapid in early years but decreases at the onset of sexual maturity (Johnson et al. 1995). Reproduction begins at age two or at lengths greater than 50 mm total length. Spawning appears to occur in spring during high water, and it is likely influenced by temperature. In Wyoming, spawning coloration has been observed in late summer but actual spawning was not confirmed (Johnson et al. 1995). A laboratory study did document spawning later in the summer than has been recorded in the wild (Billman et al. 2008). A female may lay more than 2500 eggs (92 mm SL, 14.6 g), but fecundity is related to length and weight. The average documented egg production of a mature leatherside chub female is 1813 eggs (n=9, Johnson et al. 1995).

A captive-breeding study examining preferred spawning habitat and early life history characteristics documented that northern leatherside greatly preferred spawning on small cobble and at the highest velocity tested (10cm/s) over large cobble, pebble, or an artificial spawning mat and slower velocities (Billman et al. 2008). Northern leatherside also spawned at multiple times and over a longer period under laboratory conditions than previously documented in the wild. The habitat selection portion of this study showed

northern leatherside preferred uncovered pools and the upper portion of riffles over covered pools and the lower portion of riffles.

Belk et al. (2005) found many northern and southern leatherside life history traits to be similar. Date of hatching varied widely within populations but was not significantly different between northern and southern leatherside populations. Age at maturity is also similar between both species, with the majority of fish maturing at two years. They did find differences in temperature specific growth rates for the two species, with northern leatherside having relatively higher growth rates at the colder temperature and southern leatherside at the warmer temperature (Belk et al. 2005).

Habitat

Northern leatherside inhabit mid-elevation desert streams systems of the Bonneville Basin and Snake River drainages. Northern leatherside require flowing water and do not persist in lakes or reservoirs (Krissy Wilson, pers. comm.). Systems occupied by both species have a broad range of widely varying physical conditions including high variability of stream flow, annual precipitation, gradient, elevation, conductivity, and pH (Wilson 1996, Wilson and Belk 2001). The elevational range of observations for northern leatherside is from 1278 to 2734 m. The summer temperature range utilized by northern and southern leatherside has been reported from 10 to 23.3˚C, but they are thought to favor rivers and streams with water temperatures between 15.6 to 20˚C (Sigler and Sigler 1987, Sigler and Sigler 1996). Microhabitat variables associated with leatherside chub presence include low water velocities (2.5 – 45 cm/sec), intermediate water depths (25 – 65 cm), and low percent composition of sand-silt or gravel substrates (Wilson 1996, Wilson and Belk 2001). Adult and juvenile leatherside chub utilize the main channel of streams more often than off channel habitats, but in the presence of nonnative predators, such as brown trout (*Salmo trutta*); leatherside chub shift habitat use to off channel habitats (Walser et al. 1999, Olsen and Belk 2001). Northern leatherside occur in streams with a broad range of temperatures and have habitat requirements of healthy riparian vegetation and intact streambanks.

HISTORICAL RANGE

The historical range of northern leatherside encompasses the northeastern margins of the Bonneville Basin in Utah, Idaho, and Wyoming, and, within the Pacific Basin, Goose Creek, and Wood and Raft Rivers in Idaho and Nevada and the Snake River above Shoshone Falls in Idaho and Wyoming (Baxter and Simon 1970, Simpson and Wallace 1982, Sigler and Sigler 1987, Johnson et al. 1995) (Figure 1). For the purpose of this strategy, historical observations are defined as records occurring on and before 1993 and recent observations as records occurring from 1994 to 2008. This selection of historical and recent observations will help to identify spatial and temporal gaps where additional surveys are needed.

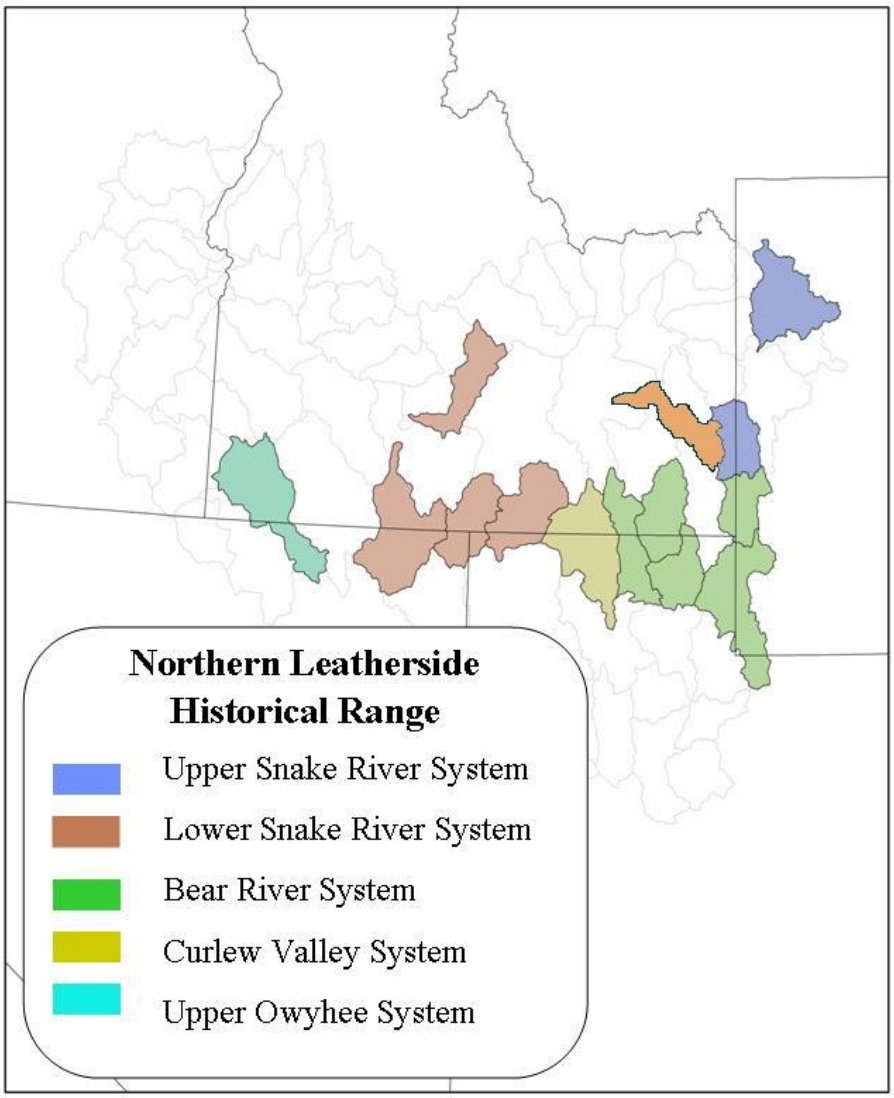

Figure 1. Northern leatherside historical range as observations recorded during and before 1993.

The historical range of northern leatherside includes the upper Bear River, the Central Bear River, the Logan River, and lower Bear River drainages of the Bear River system; the Snake River headwaters and Salt River drainages of the upper Snake River system; Raft River, Goose Creek, Salmon Falls, Big Wood River, Blackfoot River, and Little Wood River of the lower Snake River system; the Curlew Valley system; and the upper Owyhee system (NatureServe 2005, UDWR database). There is reference to historical documentation of northern leatherside in two hydrologic unit codes (HUCs) in the Middle Snake drainage near Boise. Reference to observations from the Bruneau River and mainstem Snake River exist but verification of and data relating to these observations have been lost (IDFG, 1995) and these HUCs will not be included in the verifiable historical range. Observations of introduced leatherside chub populations have been found in the Strawberry, Green, and Fremont Rivers within the Upper Colorado River Basin, but these observations are not within the historical range of northern leatherside.

CURRENT DISTRIBUTION

Geographic Management Units

Northern leatherside have been documented in four 4th level HUCs in the Bear River drainage, two 4th level HUCs in the upper Snake River drainage, and six 4th level HUCs in the lower Snake River drainage. Historical observations have also been documented in the upper Owyhee system and the Curlew Valley system, but the accepted belief is that northern leatherside are extirpated from these systems. Introduced populations of leatherside chub have been observed in eight 4th level HUCs in the Colorado River Basin and are still extant in the Fremont River, Pleasant Creek, Dirty Devil River, and Quitchupah Creek in Utah (lowest three HUCs, Figure 2). It is not known if these populations are northern or southern leatherside. If these populations are determined to be northern leatherside, they may have management implications.

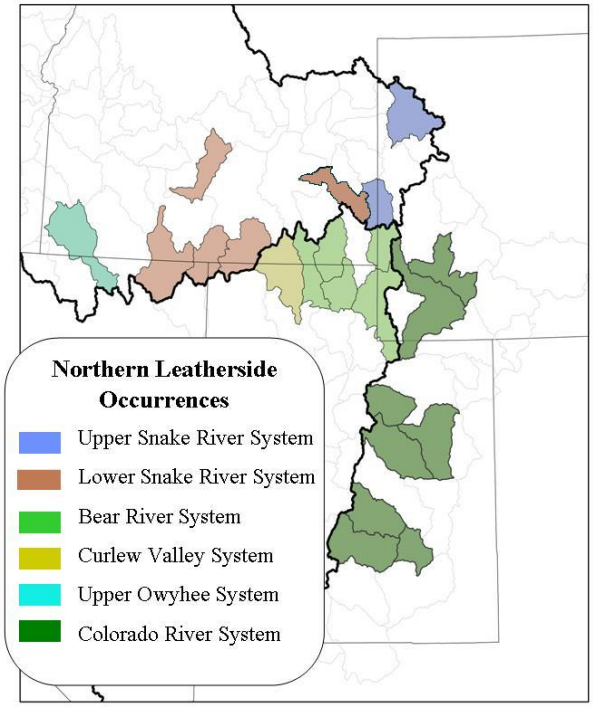

Figure 2. Historic and current northern leatherside occurrences in their native and introduced range.

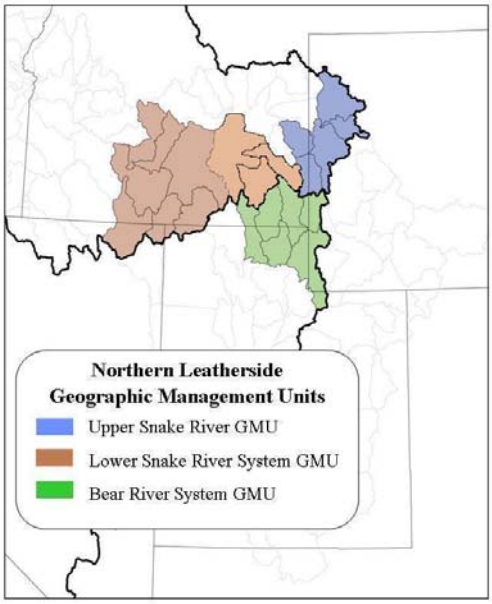

Figure 3. Northern leatherside geographic management units.

The HUCs within the historical range of northern leatherside can be grouped into three hydrologic units, which delineate areas ideal for geographic management units (GMU): the Bear River System; the upper Snake River accounting unit; and portions of the lower Snake River accounting unit (Figure 3). Since each GMU delineates a drainage system, they are ideal organizational units for conservation actions for northern leatherside. Additional HUCs that do not contain historical northern leatherside observations have been included in the GMUs in order to promote connectivity for metapopulation dynamics.

More detailed distributional information in each of these GMUs is provided later in this document.

The observations from the eight HUCs in the Colorado River Basin are outside the historical range of northern leatherside and will not be identified within a GMU, but future research on the genetics of these introduced populations may have management implications for their use as refuges.

THREATS

The success of any conservation or recovery program depends on eliminating or reducing the impact of activities that threaten the species' existence. Several problems and threats have been identified and described for northern leatherside by federal and state agencies. These threats were identified based on the criteria of Federal listing as required by Section 4(a)(1) of the ESA. The following discussion summarizes the significant threats to northern leatherside that will be addressed by conservation actions described in this Strategy.

Destruction, Modification, or Curtailment of Habitat

Northern leatherside are threatened rangewide by habitat degradation, modification, and fragmentation.

Habitat degradation from water development (e.g., diversions and dams), stream alterations (e. g., channelization, barriers, etc.), and grazing are substantial threats to northern leatherside populations. Several northern leatherside streams are completely dewatered for irrigation during periods of high water usage.

Roads and train tracks are frequently built parallel to streams, which may impact northern leatherside habitat rangewide. Some stream channels have been straightened to accommodate the transportation corridors, and many of the roads and tracks produce large volumes of sediment that wash into the streams. This sediment affects water quality, instream substrate and cover, channel characteristics, and may increase egg mortality. In addition, many stream crossings are poorly designed. In several cases, culverts or bridges are creating barriers to upstream movement for northern leatherside. Additionally, extensive mining both for coal and fossil fuels impact streams through associated activities, such as water withdrawals, road building, and transportation of mined products via trucks or trains.

Past and current livestock grazing practices impact northern leatherside and their habitat. Improper grazing practices can alter sediment transport regimes and streambank stability which in turn can alter water quality, substrate composition, and channel structure. Specific ramifications include loss of instream cover, loss of channel complexity, increased water temperature, and loss of preferred substrate.

Northern leatherside distributions have become increasingly fragmented over time, resulting in the loss of extant populations as well as individuals within populations (Wilson 1996, Wilson and Belk 1996b, Wilson and Lentsch 1998, Wilson and Belk 2001). Some of this fragmentation is natural and has occurred over thousands of years in conjunction with historical changes in climate and geography. However, much of the current fragmentation populations experience is likely anthropomorphic, potentially caused by factors such as irrigation projects, road crossings, habitat degradation, and the introduction of nonnative fish predators.

Habitat fragmentation is a substantial threat to northern leatherside populations. Northern leatherside that once occupied continuous drainages are now divided into smaller subpopulations with limited opportunity for genetic exchange. Fragmentation also limits access to preferred or necessary habitats, which ultimately threatens population viability. Populations subject to habitat fragmentation have a high probability of extirpation due to disjunct and restricted distributions, which increase the vulnerability of northern leatherside to environmental or demographic perturbations. Small isolated populations are more susceptible to catastrophic loss and impacts from demographic stochasticity than are larger, more widely distributed populations (Allendorf and Leary 1988, Lande 1988, Nagel 1991). Natural climatic events such as flood, fire, and drought may threaten fragmented populations. These forces, in combination with poor land use practices, pose threats as long as northern leatherside range remains fragmented and populations are small.

Over-utilization for Commercial, Recreational, Scientific or Educational Purposes

The use of live baitfish by anglers is not permitted in northern leatherside range. Regulations in Utah, Nevada, and Idaho prohibit anglers from collecting fish for bait and reduce the possibility of having competing species released by anglers into waters inhabited by northern leatherside. In Utah, northern leatherside is a state protected species and regulations have classified this species as a prohibited fish that may not be taken, held in possession, or commercially harvested (R657-3-23, R657-13-13 and R657-14-8). The Idaho 2008-2009 Fishing Seasons and Rules including Steelhead states that live fish cannot be used as bait. Northern leatherside are a protected nongame species under Idaho law and cannot be harvested or possessed. The Utah Division of Wildlife Resources and the Wyoming Game & Fish Department strictly review, monitor and control all scientific and educational collection permits issued for activities in the states of Utah and Wyoming, respectively. Due to these controls, over utilization by anglers is likely not a major threat. Also, the number of northern leatherside taken for scientific and/or educational purposes is low and the fish do not face the threat of overharvesting.

Disease, Predation, Competition, and Hybridization

Predation pressure not only causes mortality, but also influences habitat choice. Nonnative fish predators appear to ecologically fragment northern leatherside into patchy peripheral stream habitats, potentially impacting local demographic processes such as growth rate, fecundity, and survivorship (Walser et al. 1999). While northern leatherside evolved with piscivorous native cutthroat, introduction of nonnative fish such as brown trout and brook trout are likely increasing predation and competition pressure. Northern leatherside are known to avoid predation by using habitat not utilized by brown trout, such as side channels and backwaters (Olsen and Belk 2001). Maintaining habitat complexity increases the ability for northern leatherside to coexist with native and nonnative fish predators. Introduced species such as brown trout and brook trout are likely having a deleterious effect on northern leatherside populations.

Hybridization had been suspected between northern leatherside and speckled and longnose dace. Wyoming Department of Fish and Game conducted a genetic analysis of

streams in the Upper Bear River HUC and found that all northern leatherside and dace sampled were genetically pure and hybridization was not occurring (Craig Amadio, pers. comm.).

Inadequate Regulatory Mechanisms

Northern leatherside is listed as Native Species Status 1 (NSS1) in the State of Wyoming because habitats are declining or vulnerable, and populations are isolated or low throughout its range (WGFD 2005). NSS1 describes populations that are greatly restricted or declining, extirpation appears possible, or that face on-going significant loss of habitat. In Utah, northern leatherside, has been placed on the Utah Sensitive Species List (2003) and is considered a "Tier II wildlife species" as outlined in the Comprehensive Wildlife Conservation Strategy (UDWR 2005). The Idaho Wildlife Action Plan also recognizes northern leatherside as a species of greatest conservation need (IDFG 2005). In Nevada, northern leatherside is not listed as a protected species (NDOW 2006).

Regulations and laws regarding water use, rights, and consumption pose a threat to northern leatherside habitat and stream hydrology. Instream flow needs for northern leatherside have been overlooked and as a result northern leatherside distribution is fragmented due to dewatering during periods of high water usage.

Other Natural or Human Induced Factors Affecting Continued Existence

Natural and human induced climatic events such as climate change, flood, fire, and drought may be threats to northern leatherside. These climatic events in combination with other stresses may have a negative impact on northern leatherside populations, although direct impacts are unknown at this time.

GOAL AND OBJECTIVES

Overall northern leatherside distribution is reduced from historical distribution (Wilson and Belk 2001), with much of this loss occurring over the past 50 to 100 years. The overriding concern is that these declines are due to human activities, as opposed to natural phenomena. In light of these declines, conservation actions are being identified and developed to manage and conserve the northern leatherside.

Goal

Ensure the long-term persistence of northern leatherside within its historic range and support development of multi-state conservation efforts.

Objectives

The following objectives will be required to attain the goal of this strategy:

Objective 1 – Identify and reduce threats to northern leatherside and its habitat.
Objective 2 – Determine the existing range of the species.
Objective 3 – Maintain and monitor existing self-sustaining populations and their habitat.

Objective 4 – Restore populations at selected localities within the historic range.
Objective 5 – Augment selected populations if necessary.
Objective 6 – Maintain genetic diversity.
Objective 7 – Identify questions and implement research that meet management needs for northern leatherside and use the findings to better meet the goal and objectives of this conservation strategy.
Objective 8 – Implement and incorporate provisions of the conservation strategy into signatory planning documents and budgets to ensure the conservation goal and objectives are achieved.

CONSERVATION ELEMENTS

The following section outlines the general list of conservation actions or elements that will eliminate or reduce threats to northern leatherside as well as expand its range back into historical localities. Each general element includes a list of specific methods, which may be implemented at rangewide, statewide, or site-specific levels. Since the degrees of northern leatherside management action will vary between populations, specific conservation actions are prioritized and implemented within each GMU as described in the next section.

A. Surveys

Inventory and describe current range of northern leatherside.

1. Identify historical northern leatherside distribution and localities utilizing museum records, agency reports, collection permits, grey literature and other sources.
2. Survey historical localities of northern leatherside for the presence of extant populations.
3. Using identified historical distribution, survey potential habitat for northern leatherside.
4. Determine areas suitable for reintroduction.

Expected Products

a. Maps of historic northern leatherside range and current distribution.
b. Identification of potential reintroduction sites.

B. Habitat Enhancement

Enhance and/or restore habitat conditions in designated areas throughout the historic range of northern leatherside.

1. Identify streams with extant northern leatherside or potential reintroduction sites. Evaluate northern leatherside habitat and assess habitat degradation, presence of nonnatives, disease and other threats.
2. Reduce or remove the identified threats to northern leatherside.

3. Restore habitat where possible, creating habitat complexity and connectivity for northern leatherside.
4. Implement habitat enhancements that may include some or all of the following: bank stabilization, enhancement of native vegetation, riparian fencing, nonnative removal, and implementing compatible grazing practices.

Expected Products

a. Increased suitable northern leatherside habitat.
b. Reduction of threats of predation and competition from nonnative species.
c. Reduction of future habitat degradation from erosion and ungulate grazing.

C. Habitat Protection

Protect and enhance habitat (via land use changes) through land acquisition, conservation easements, or regulatory mechanisms.

1. Identify, prioritize, and protect northern leatherside habitats.
2. Acquire conservation easements with landowners. The easements will provide for long-term habitat and water protection and provide habitat enhancement as needed.
3. Pursue land and water acquisition as necessary in critical areas where conservation easements do not apply.
4. Develop cooperative agreements with landowners. The agreement will specify methods to eliminate or reduce those impacts on northern leatherside habitats.
5. Develop agreements (Memoranda of Understanding, etc) with local, state and federal agencies to protect northern leatherside habitats as needed.

Expected Products

a. Agreements, easements, acquisitions, and/or cooperative agreements with private landowners and/or public entities to protect northern leatherside and its habitats as needed.

D. Restore Hydrologic Conditions

Maintain, restore and/or augment natural hydrologic characteristics and water quality.

1. Identify water needs in current and potential northern leatherside habitats.
2. Protect by acquisition, easement, MOU, and/or Cooperative Agreements.
3. Maintain natural hydrologic conditions.

Expected Products

a. Secure water sources for northern leatherside habitats.

E. Nonnative Control

Selectively control nonnative species that negatively impact northern leatherside via predation and/or competition.

1. Determine detrimental interactions between northern leatherside and nonnative species (predation, competition, hybridization, or disease).
2. Control or modify stocking, introductions, and spread of nonnative aquatic species where appropriate.
3. Reduce or eliminate detrimental species where feasible.

Expected Products

a. Research identifying the negative impact of nonnatives on northern leatherside.
b. Reduction of the spread of nonnative species and their impacts on northern leatherside.

F. Range Expansion

Conduct surveys, life history, and genetic studies to determine habitat requirements for translocation of northern leatherside into historic areas.

1. Survey northern leatherside habitats for potential reintroduction sites as needed.
2. Develop site selection criteria and select sites for reintroductions as needed.
3. Conduct genetic surveys to determine relatedness of any new northern leatherside populations.
4. Complete all necessary compliance needed to introduce northern leatherside.

Expected Products

a. Data outlining the relatedness within and among northern leatherside populations.
b. Recommendations for range expansion protocols.
c. Expansion of northern leatherside distribution and associated increased population stability.

G. Monitoring

Monitoring goals seek to detect changes in population distribution over time.

1. Develop monitoring program with standardized protocols for established northern leatherside populations and habitat.
2. Evaluate monitoring on a regular basis and amend conservation actions as indicated by monitoring results.
3. Maintain northern leatherside database.

Expected Products

a. Baseline population data to monitor effectiveness of conservation actions.
b. Evaluations of population health and viability.

c. Warnings when populations drop will trigger additional study and appropriate conservation actions.

H. Regulation

Provide protection of northern leatherside populations and genetic integrity through regulations prohibiting collection, possession, and transportation.

1. Maintain and enforce current code regulations of participating state agencies that prohibit the collection, possession, and transportation of northern leatherside.
2. Maintain consistency with participating state policies on fish stocking and transfer procedures.
3. Ensure biosecurity protocols are followed and enforced through each states' permitting process.

Expected Products

a. Enforcement of regulations should eliminate the threat of over-utilization.
b. Prevent stocking of species that could have a potentially negative impact to northern leatherside and its habitat.
c. Enforcement of violations and penalties.
d. Improved communication and cooperation among local government and public interest groups.
e. Prevention of introduction and/or spread of pathogens and diseases.

I. Disease Management

Determine the extent of infection in populations, monitor effects of pathogenic infection and prevent further infection by implementing biosecurity protocols.

1. Adopt and require the use of disease and pathogen protocols for augmentation and reintroduction of northern leatherside.
2. Incorporate disease and pathogen protocols into research and collection permits issued under state authorities.
3. Follow biosecurity protocols when moving fish, personnel, and field equipment between sites.

Expected Products

a. Identification and reduction of potential threats of disease and pathogen infection.

J. Information and Education

Increase public awareness and support for the conservation of northern leatherside.

1. Produce and distribute educational information on northern leatherside to the public and encourage other natural resource agencies to incorporate northern leatherside awareness into their Information and Education programs.

2. Educate the public on the values of protecting ecosystems and restoring native species.

   Expected Products

   a. Educational products made available for schools, special interest groups, and the public (i.e. fact sheets, posters, educational documents, interpretive signs, public website).
   b. Increased public support for conservation programs.

NORTHERN LEATHERSIDE GMUS

The Bear River GMU in the Bonneville Basin and the upper and lower Snake River GMUs within the Pacific Basin represent the potential range of northern leatherside.

Northern leatherside locality records are compiled from the following sources:

UTAH DIVISION OF WILDLIFE RESOURCES
Utah Natural Heritage Program database
Native Aquatic Species Program database
Utah Certificate of Registration (COR) reports
Stream survey information
Agency and contracted reports

WYOMING GAME AND FISH COMMISSION
Fisheries database
Agency and contracted reports

IDAHO DEPARTMENT OF FISH AND GAME
Agency reports
Contracted reports

NEVADA DIVISION OF WILDLIFE
Stream survey information

CARIBOU-TARGHEE NATIONAL FOREST
Agency and contracted reports

Museum records and peer reviewed journal articles have also been utilized. Only records that can be identified as northern leatherside were used, hence this is not an exhaustive list of all the historical northern leatherside localities. Available information is spotty. Many records do not list small native fish to species, but rather to a general grouping such as minnow that cannot be verified to species.

Bear River Drainage GMU

The type locality account for northern leatherside is from the Bear River at Evanston, Uinta Co., Wyoming (Jordan and Gilbert 1881) within the Bear River drainage. This GMU contains six HUCs, four of which have northern leatherside observations. Northern leatherside observations have not been recorded within the Bear Lake HUC (16010201) and the Middle Bear River HUC (16010202), but these HUCs may be important for northern leatherside metapopulation dynamics to support connectivity between populations.

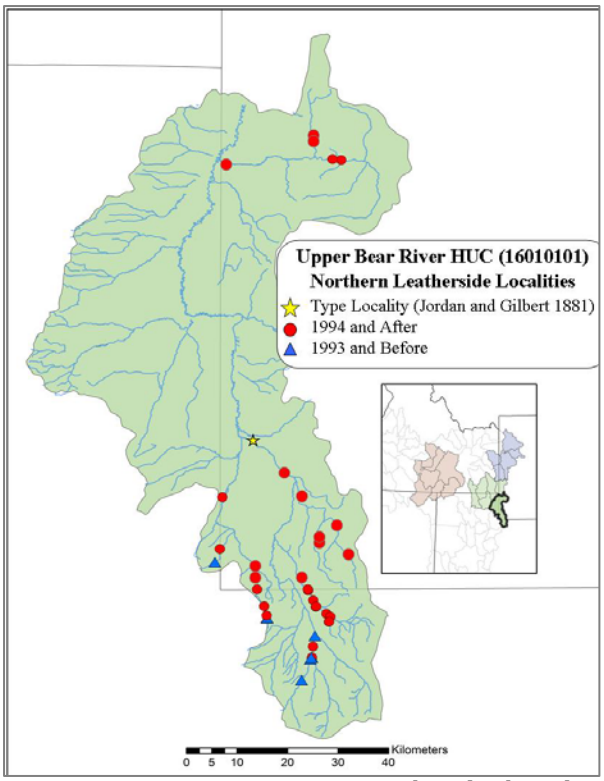

Figure 4. Upper Bear River northern leatherside localities.

UPPER BEAR RIVER HUC (16010101)

Historical observations of northern leatherside from this HUC include the type locality described from a sample collected near Evanston, Wyoming in 1881 (Jordan and Gilbert 1881) (Figure 4). In Wyoming, northern leatherside was found historically in Twin and Rock Creeks in 1975, Sulphur and Yellow Creeks in 1972, the Bear River in 1972 and Mill Creek (Baxter and Stone 1995; and Miller 1977). In Utah, historic records occur in Hayden Fork, Yellow Creek, Thief Creek, and the East Fork of the Bear River (NatureServe 2005).

Surveys in 2003 revealed that northern leatherside still occur in the upper portions of Twin Creek, WY, although subsequent surveys in 2005 did not document northern leatherside in this reach (Pete Cavalli pers. comm.). Trout Unlimited surveys in 2008 documented northern leatherside in Twin Creek near the Utah border (Paul Thompson, pers. comm.). Northern leatherside have been documented in Rock Creek above the first (Kirk Dahle, pers. comm.) and third diversions (Pete Cavalli pers. comm.). Mill Creek, a tributary to the Bear River south of Evanston, Wyoming, was sampled during 2004, 2006, and 2007. Spot electrofishing documented several northern leatherside within a mile of the Utah-Wyoming border in Wyoming (Craig Amadio pers. comm.). Very low numbers of northern leatherside have been documented in the mainstem Bear River in Wyoming (Craig Amadio pers. comm.). LaChapelle Creek, Yellow Creek, and Sulphur Creek in Wyoming were also sampled in 2006 and 2007 and northern leatherside are relatively abundant in these reaches (Craig Amadio pers. comm.). However, no northern leatherside were found during surveys of LaChapelle Creek and Sulphur Creek headwaters in Utah (Webber 2008). Hayden Fork, Yellow Creek, Thief Creek, the East Fork of the Bear River, and their tributaries were surveyed again in Utah in 2002, 2003 and 2006 respectively. Extant populations still occur in Hayden, Yellow, and Thief Creeks. Evidence from the surveys in Utah and Wyoming extends our knowledge of northern leatherside distribution beyond historical observations to include the mainstem of the Bear River, Mill Creek, Deadman Creek, and Stillwater Fork (Nadolski and Thompson 2004).

Within the range extension, northern leatherside occupation is limited to approximately 1.6 km of the lower reaches of Deadman Creek and 8 km of Mill Creek from the Utah-Wyoming border upstream. All age classes of northern leatherside were observed in Deadman Creek and Mill Creek, but densities were low in Mill Creek (Nadolski and

Thompson 2004). Five northern leatherside were observed in the Bear River mainstem (Cowley 2003) but subsequent surveys yielded only one additional fish (Nadolski and Thompson 2005). Historical evidence documented from 1953, of northern leatherside occupation in this area occurred just upstream of the East Fork of the Bear River confluence with the Bear River (NatureServe 2005). Surveys in 2003 of Hayden Fork and Stillwater Fork documented only one northern leatherside in each stream (Nadolski and Thompson 2004). Historical observations also indicate a limited number within these streams (Nadolski and Thompson 2004). Only a few individuals were observed in Thief Creek during a 2002 survey (Nadolski and Thompson 2003) and one individual was found in 2006 (Webber 2008). Relative to these sites, northern leatherside have been documented in greater numbers throughout approximately 9 km of Yellow Creek in Utah (Webber 2008).

Hybridization between northern leatherside and speckled and long nose dace was suspected in this HUC in Wyoming. WGFC conducted a study taking samples of all species from Mill, LaChapelle, Yellow, and Sulphur Creeks. Genetic analysis showed that all fish tested were genetically pure and there was no evidence for hybridization (Craig Amadio, pers. comm.).

Central Bear River HUC (16010102)

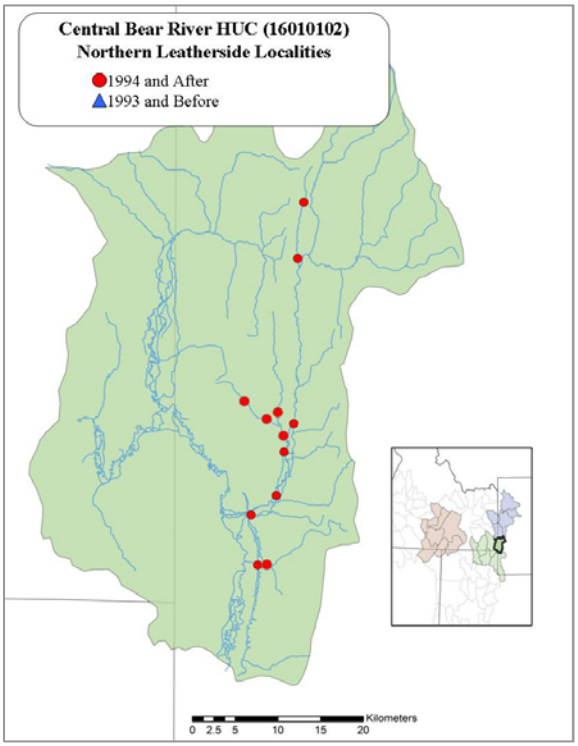

Figure 5. Central Bear River northern leatherside localities.

Historical observations of northern leatherside occurred in Third Creek and Muddy Creek (tributary to Smiths Fork) (Miller 1977). Additional accounts are limited and the historic distribution is not fully known in this HUC.

Surveys in 2003 and 2005 documented northern leatherside populations in Dry Fork of the Smiths Fork (Pete Cavalli pers. comm.) (Figure 5). Northern leatherside were also documented in several canals that are fed from the Smiths Fork River (Pete Cavalli pers. comm.). Surveys in 2005 documented northern leatherside in Sublette Creek (Pete Cavalli pers. comm.). Additionally, Trout Unlimited captured over 100 northern leathersides in a 100 meter reach of Muddy Creek and seven northern leathersides in Mill Creek in 2007 (Kirk Dahle pers. comm.).

Logan River HUC (16010203)

Historical observations of northern leatherside within this HUC are recorded for the Little Bear River on three separate occasions from 1957 to 1967 and in the Logan River in 1967 and 1972 (NatureServe 2005) (Figure 6).

Surveys completed in 2004 and 2006 did not find extant populations in Utah (Webber 2008).

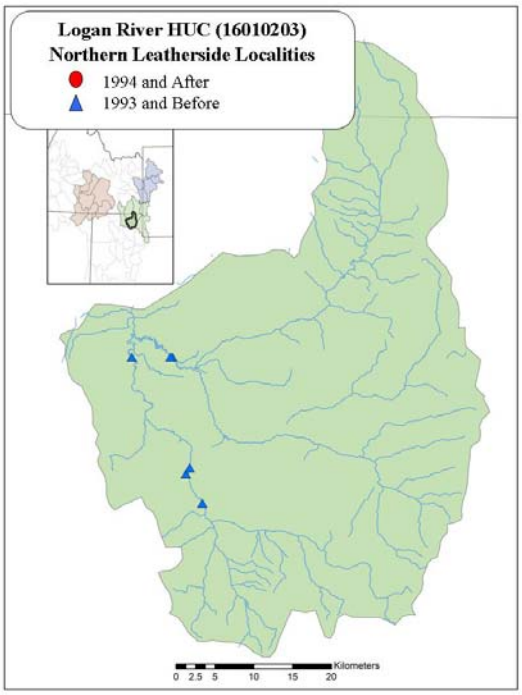

Figure 6. Logan River northern leatherside localities.

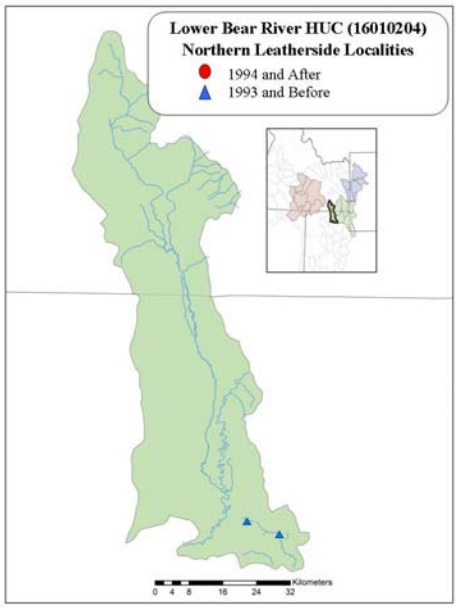

Figure 7. Lower Bear River northern leatherside localities.

Lower Bear River HUC (16010204)

Historical observations from 1954 documented northern leatherside for this HUC in Box Elder Creek (Figure 7).

The headwaters of Box Elder Creek were surveyed intensively between 1988 and 1997 and large numbers of brown trout were documented (Ruppert and Chanson 1998). Additional surveys in 1994 and 1998 did not find extant populations in Utah (Nadolski, pers. comm.).

Threats

Habitat degradation and introduction of nonnative species are the primary threats to the northern leatherside populations in the Bear River Drainage GMU.

Habitat degradation

Stream alterations (e.g. roads, railroads, channelization, barriers etc.), mining, livestock grazing, and water development (e.g., diversions and dams) have caused substantial habitat degradation and pose significant threats to northern leatherside populations in this GMU. Additionally, portions of this system are completely dewatered for irrigation during periods of high water usage.

Introduction of Nonnative Species, Disease

Introduced species such as brown trout and brook trout are likely having a deleterious effect on northern leatherside populations in this HUC. Predation and competition by these introduced nonnative species pose a significant threat to northern leatherside.

Lower Snake River Drainage GMU

Northern leatherside were not collected in the Snake River until 1934 and Sigler and Sigler (1987) speculated they may have been introduced to this system; however, recent evidence refutes this (Johnson et al 2004). This GMU contains ten HUCs, six of which have records of northern leatherside observations. While all ten HUCs do not have documented historical distribution, maintaining connectivity between these and occupied HUCs may be important for northern leatherside metapopulation dynamics.

RAFT RIVER HUC (17040210)

Historical observations for northern leatherside are recorded for this HUC in Cassia Creek (Grunder et al. 1987) but could not be verified (Figure 8).

Surveys of Cassia Creek and tributaries in 1995 did not document any northern leatherside (Belk and Wilson 1995). Idaho BLM also surveyed Cassia Creek and the Raft River in 2005 and did not document northern leatherside (Dan Armichardy pers. comm.).

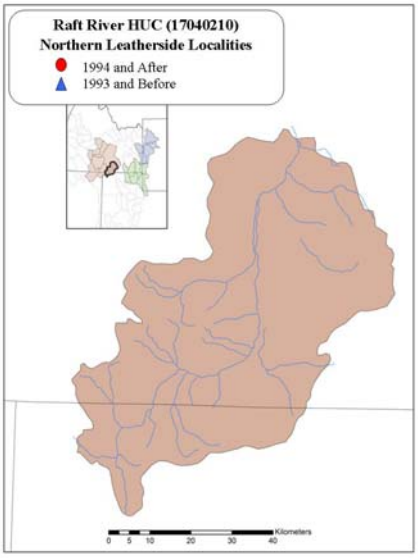

Figure 8. Raft River northern leatherside localities.

GOOSE CREEK HUC (17040211)

Historical observations for northern leatherside are recorded for this HUC in Idaho in Goose Creek and Beaverdam Creeks and were vouchered in Trapper Creek (Grunder et al. 1987).

These areas were resurveyed in 1995 and northern leatherside were documented in each of these creeks (Belk and Wilson 1995) (Figure 9). In 2001, northern leatherside were found in the Goose Creek drainage on the Idaho side of the Utah-Idaho border (Thompson 2002). All Utah tributaries to Goose Creek were surveyed in 2001 and no northern leatherside were observed (Thompson 2002). Although native fishes were found in large numbers, northern leatherside were not found in a 2003 survey near the Nevada border (Nadolski and Thompson 2003). During 2000-2003 Idaho Department of Fish and Game researchers

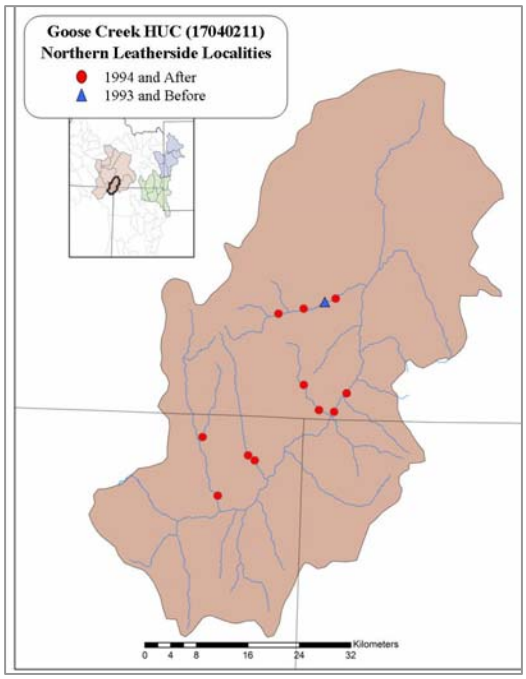

Figure 9. Goose Creek northern leatherside localities.

documented and vouchered northern leatherside from the mainstem Goose Creek, Trapper Creek, and Trout Creek in Nevada (Scott Grunder, pers. comm. 2008). Idaho BLM surveyed Trapper, Beaverdam, and Goose Greek in 2005 and did not document northern leatherside in Goose or Trapper Creek at that time (Dan Armichardy pers. comm.). Nevada Department of Wildlife sampled and positively identified northern leatherside from Goose Creek in 2001 and Trout Creek in 2008 (Gary Johnson pers. comm.).

SALMON FALLS CREEK HUC (17040213)

Northern leatherside observations are reported in Big Creek within this HUC, but no vouchers verify the records (Scott Grunder, pers. comm. 2008).

NatureServe (2005) indicates current distribution of northern leatherside within this HUC. In 2003, IDFG sampled and field identified northern leatherside from North Fork Salmon Falls Creek and Salmon Falls Creek in Nevada (Gary Johnson pers. comm.) (Figure 10). Surveys of the North Fork of Salmon Falls Creek in Idaho by Idaho BLM did not document any northern leatherside (Dan Armichardy pers. comm.).

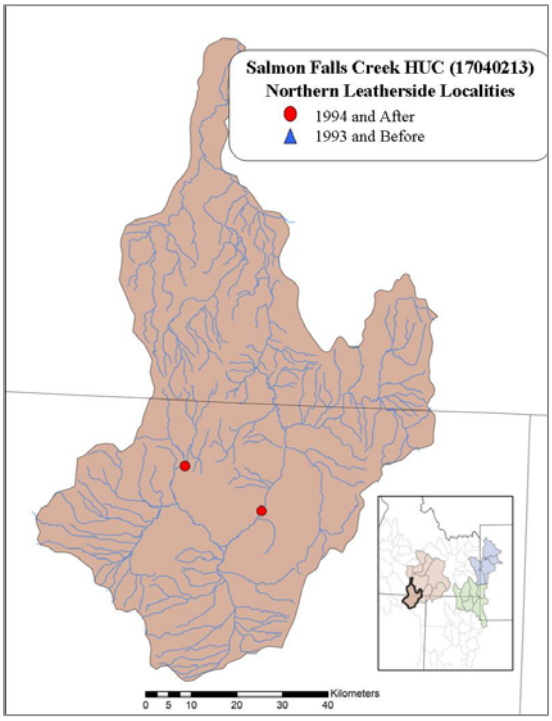

Figure 10. Salmon Falls Creek northern leatherside localities.

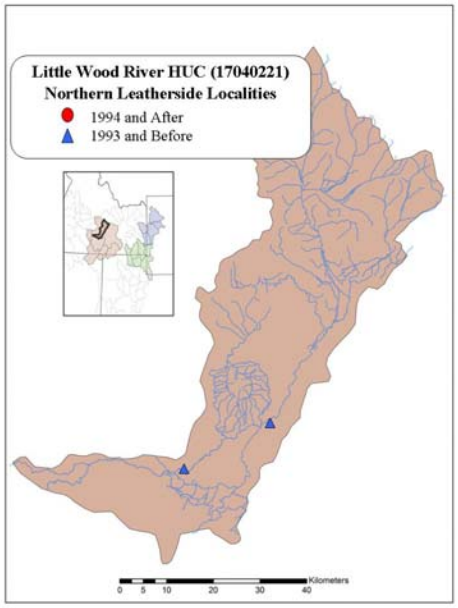

Figure 11. Little Wood River northern leatherside localities.

LITTLE WOOD RIVER HUC (17040221)

Northern leatherside were documented in the Little Wood River in 1934 (USDA 2003, Scott Grunder pers. comm. 2008).

NatureServe (2005) has indicated that this HUC is part of the northern leatherside historical distribution (Figure 11). However, no recent data are available to determine if the population persists.

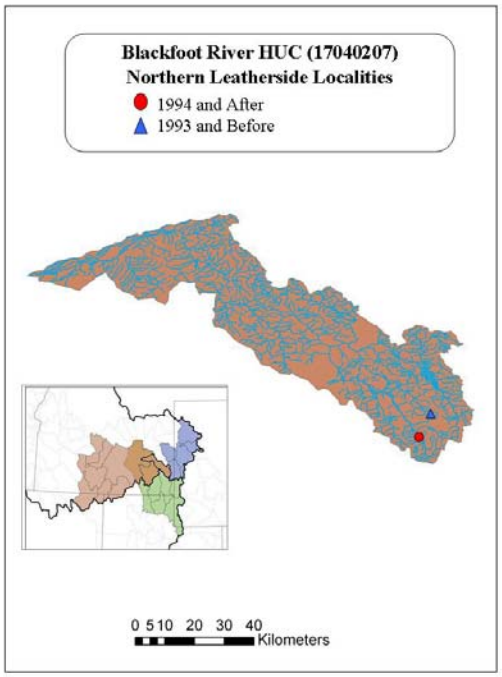

Figure 12. Blackfoot River northern leatherside localities.

BLACKFOOT RIVER HUC (17040207)

Northern leatherside were documented in Angus Creek within the Blackfoot River HUC (James Capurso pers. comm.). Although this sample was vouchered and verified, the date is unknown (Figure 12).

In 2001 IDFG documented northern leatherside in Slug Creek (Meyer 2001).

There is little known of the historic or current distribution within this HUC, but populations likely still persist here.

BIG WOOD RIVER HUC (17040219)

Northern leatherside have been documented, but not verified, in the Big Wood River and the tributary of Willow Creek during an eradication project in 1960 within this HUC (USDA 2003, Scott Grunder pers. comm., IDFG 1999) (Figure 13).

Recent surveys aimed at other fish species did not document northern leatherside in this HUC (Scott Grunder pers. comm.).

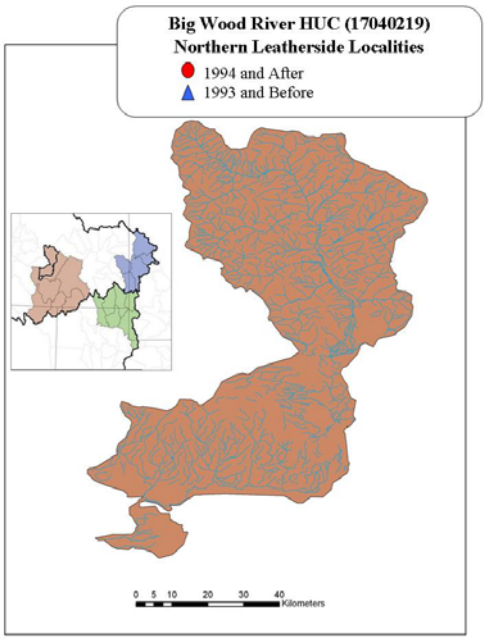

Figure 13. Big Wood River northern leatherside localities.

Threats

The primary threat to the Lower Snake River Drainage GMU is likely habitat degradation and alteration from livestock grazing, road building, residential developments and water use. Introduction of nonnative species has also likely had a negative impact on northern leatherside. However, much of the land within this GMU is on private property and access is limited. Without access to private property, the present or potential destruction, modification, or curtailment of leatherside habitat or range and impacts from nonnative species within this HUC cannot be thoroughly evaluated.

Upper Snake River Drainage GMU

This GMU contains five HUCs, two of which have records of northern leatherside observations. Northern leatherside observations have not been recorded within the Gros Ventre HUC (17040102), the Greys River HUC (17040103), or the Palisades River HUC (17040104). Although historic populations were not documented, maintaining connectivity through these HUCs may be important for northern leatherside metapopulation dynamics and long-term persistence.

SNAKE RIVER HEADWATERS HUC (17040101)

Recent evidence suggests that a northern leatherside population in Pacific Creek, Wyoming, thought to be introduced, is actually endemic (Johnson et al. 2004). Simon (1951) stated that northern leathersides have been collected from the upper Snake River in small numbers and from Pacific Creek where they are relatively common. Baxter and Simon (1970) also include small numbers in side channels of the Buffalo Fork of the Snake River. Historic northern leatherside distribution was verified in Buffalo Fork in 1934 and Pacific Creek in 1941 (James Capurso pers. comm.).

Surveys from 2003 document that northern leatherside still occur in Pacific Creek (Rob Gipson pers. comm.) (Figure 14).

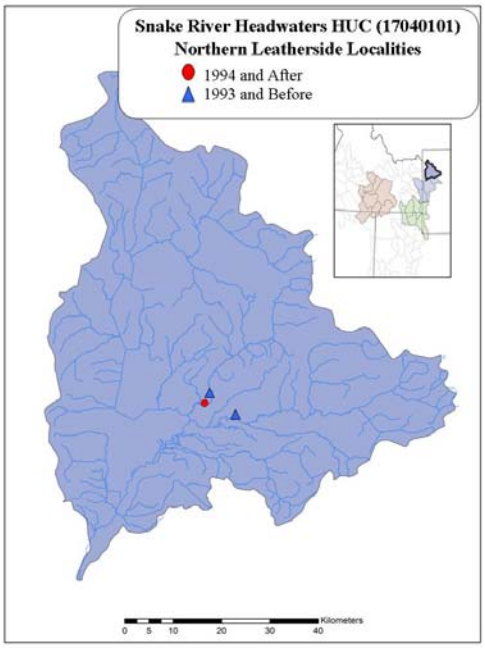

Figure 14. Snake River Headwaters northern leatherside localities.

SALT RIVER HUC (17040105)

Historical documentation from surveys in 1969 exists for northern leatherside in Tincup Creek (James Capurso pers. comm.).

Northern leatherside were verified and confirmed in Tygee Creek in Idaho by Chadwick Ecological Consultants, Inc. in 2000 (Figure 15). Northern leatherside were the dominant species in the native fish community that was sampled (Chadwick Ecological Consultants, Inc. 2001). Surveys in 1996 of the Salt River HUC documented northern leatherside in Jackknife Creek (Isaak and Hubert 2001).

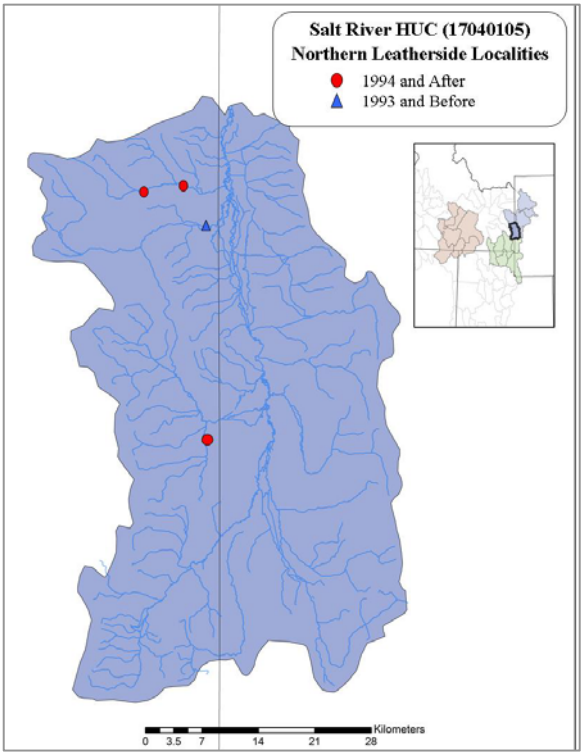

Figure 15. Salt River northern leatherside localities.

Threats

Threats to northern leatherside in the Upper Snake River Drainage GMU include habitat degradation and alteration due to residential development, water diversion, livestock grazing, mining, irrigation, and the introduction of nonnative species.

Northern leatherside have historically been very rare in the Snake River headwaters. The majority of the Snake River headwaters lie within Grand Teton National Park and the Teton Wilderness area. As a result, habitat disturbances are minimal. Habitat degradation in the Salt River valley however is impacted by agriculture practices, residential development, and mining activities.

Introduced species, such as brook trout and brown trout, may have a deleterious effect on northern leatherside populations in this GMU. Brook trout are not currently stocked in the drainage, but self-sustaining populations are present.

CONSERVATION TEAM MANAGEMENT

The success of this Strategy will depend upon the ongoing cooperation among the signatories to the Agreement. Leadership of the team will rotate among each state fish and wildlife agency (UDWR, WGFC, IDFG, NDOW). Each signatory agency will continue their participation via a representative on the Northern Leatherside Conservation Team. The primary duties of the Team include: coordination of conservation activities, review and revision of the Conservation Strategy (as needed), review of annual assessment report, the technical review of proposals, and ongoing conservation activities.

The population and habitat data collected from the participating states' monitoring programs have provided vital feedback on the management of northern leatherside conservation actions. Monitoring population trends allows the Conservation Team to assess the effectiveness of their management actions. This method of adaptive management incorporates flexibility into conservation actions. The results of the Team's management actions are measured through monitoring population trends. Annual monitoring of northern leatherside populations is the primary method to provide feedback to the Conservation Team and is the only method we have to measure and demonstrate the achievements of the Agreement and Strategy.

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