Idaho Department of Fish and Game
Idaho Transportation Department- Districts 3, 4, and 5
Fish and Wildlife Linkage Project GIS Layers
Final Report

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Introduction

Geodata Services, Inc. worked with Bill Ruediger and the Idaho Department of Fish and Game to complete an assessment of wildlife linkage areas in the Idaho Transportation Department Districts 3, 4, and 5. Geodata Services, Inc. (Geodata) supported four expert workshops to develop wildlife linkage maps for the study area . The process involved assembly of GIS layers and imagery, and GIS analysis to develop a wildlife linkage model in a selected area of Idaho Transportation Department (ITD) District 5. The overall assessment area included a four mile area on either side of the state and federal highways within 25 counties in southern and central Idaho (see Figures 1-3). The purpose of the assessment was to identify opportunities and needs for protecting or creating appropriate movement habitats for wildlife, identify linkage areas for wildlife, and address areas of interest along the highway segments relating to wildlife habitat, development pressure and public safety. A total of 178 linkage areas were identified in the study areas, including 18 linkage areas noted as having ecosystem importance and 126 linkage areas with local and/or regional importance. The process followed a rapid assessment format that has been utilized in northern Idaho and Western Montana (Ruediger, 2004).

The report is organized into four sections. Following the introduction, the second section provides a brief overview on the wildlife linkage areas along state and federal highways in ITD Districts 3, 4, and 5, the primary product of this project. The third section includes descriptions of data layers used in the project and the analysis process for the large carnivore and ungulate linkage model, and GIS project deliverables, project methodology and list of participants in the four expert workshops. Section four includes a summary of the process used to derive the linkage areas of interest. Appendix A includes the detailed wildlife linkage maps for the project. Appendix B includes the comments and documentation on each area, provided during the expert workshops. Appendix C includes a list of all participants in the expert workshops. Appendix D documents the detailed GIS analysis steps for the large carnivore and ungulate wildlife linkage model generated for the project prior to the expert workshops. Accompanying the report are six ESRI grid layers representing the final linkage model components and the three final linkage area GIS polygon layers.

Project Results

Figures 2-4 show an overview of the project area. See Appendix A for larger scale maps of the linkage areas, along with an index of the map tiles. Comments and notes collected during the expert workshops are provided in Appendix B, along with the species of interest in each linkage area (refer to the detailed maps in Appendix A to crosswalk the linkage area identification numbers to the location of the linkage area on the map).

Figure 1. District 3 Study Area

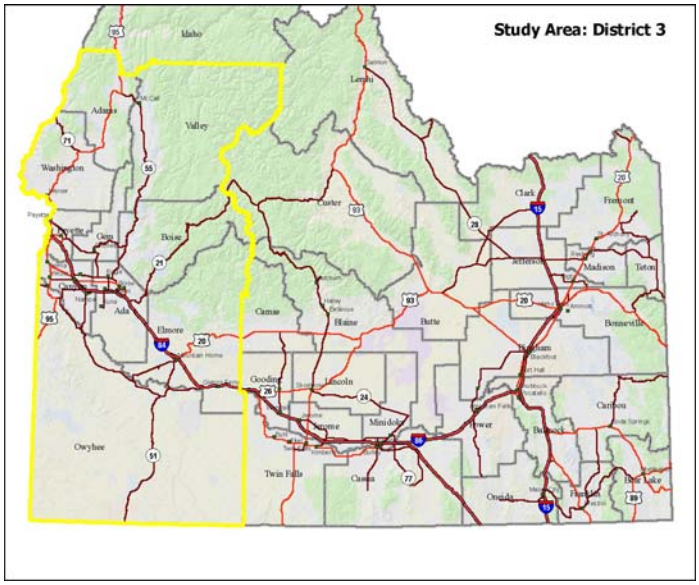


Figure 2. District 4 Study Area

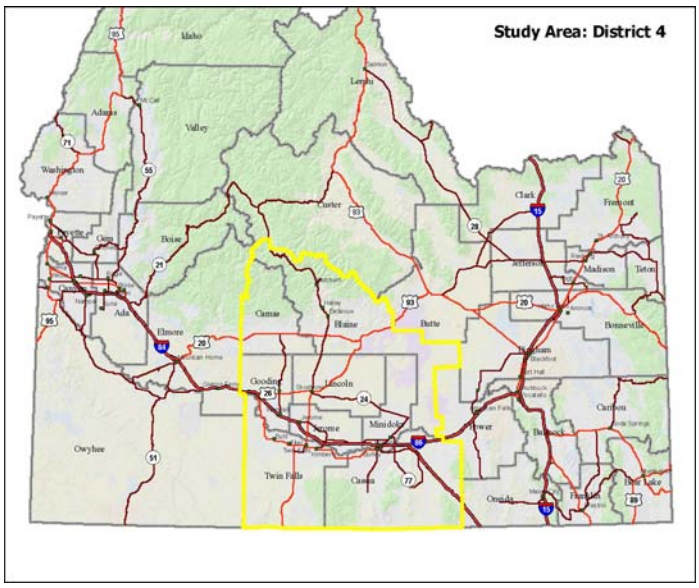
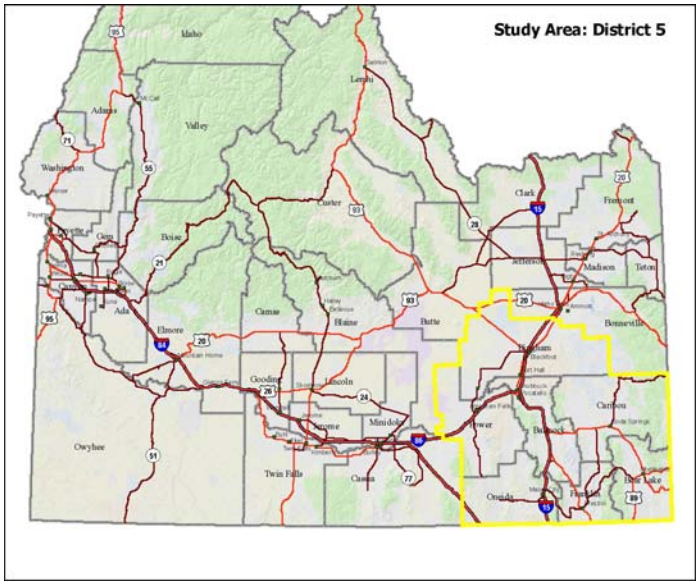


Figure 3. District 5 Study Area



The linkage areas were usually not discreetly defined areas confined by vegetative or topographic features. More typically, they were general areas of highway or road segments identified between mileposts and mapped in the expert workshops. In some instances actual wildlife crossings of highways are at well defined locations, such as a bridge or overpass, although they may cross laterally over a broad area or through funnel-shaped areas. To standardize the linkage areas recorded in the expert workshops, we placed a 500 meter buffer around each identified road segment.

ITD District 3 includes approximately 1100 miles of federal and state highways. A total of 82 linkage areas were identified in ITD District 3, for a total of 363 miles of linear road segments. The ITD District 3 linkage areas include 6 linkage areas noted as having ecosystem importance and 56 linkage areas with local and/or regional importance.

Figure 4. District 3 Wildlife Linkage Areas

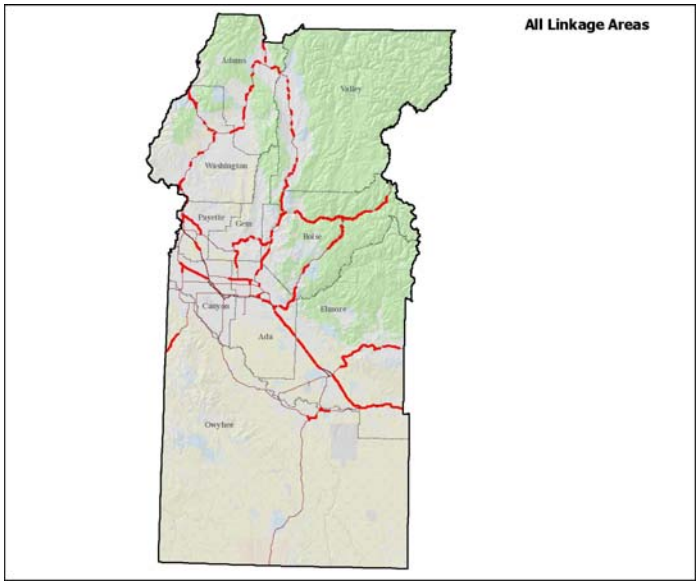
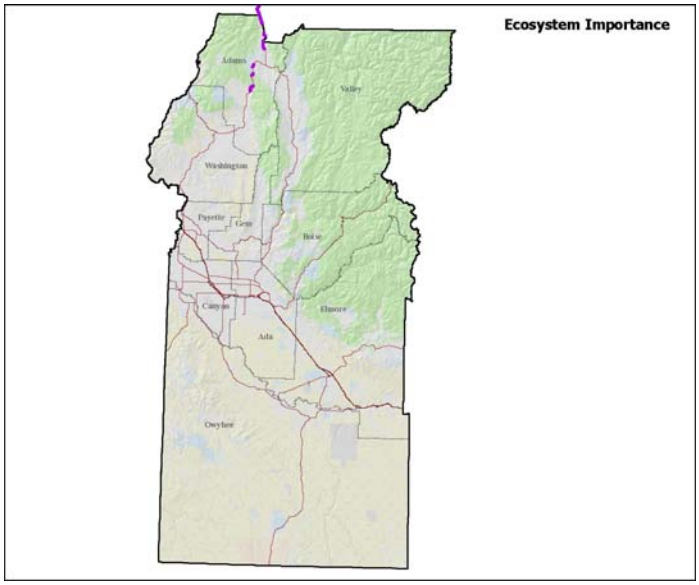


Figure 5. District 3 Linkage Areas of Ecosystem Importance



ITD District 4 includes approximately 875 miles of federal and state highways.
A total of 52 linkage areas were identified in ITD District 4, for a total of 480 miles of linear road segments. The ITD District 4 linkage areas include 5 linkage areas noted as having ecosystem importance and 38 linkage areas with local and/or regional importance.

Figure 6. District 4 Wildlife Linkage Areas

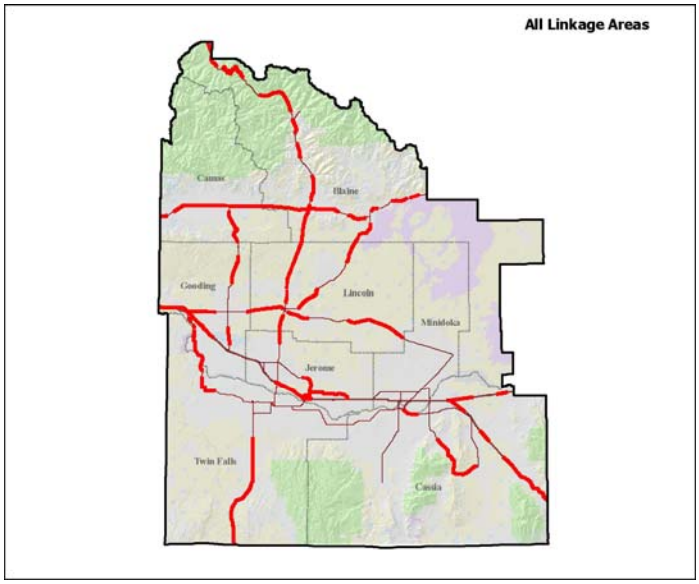
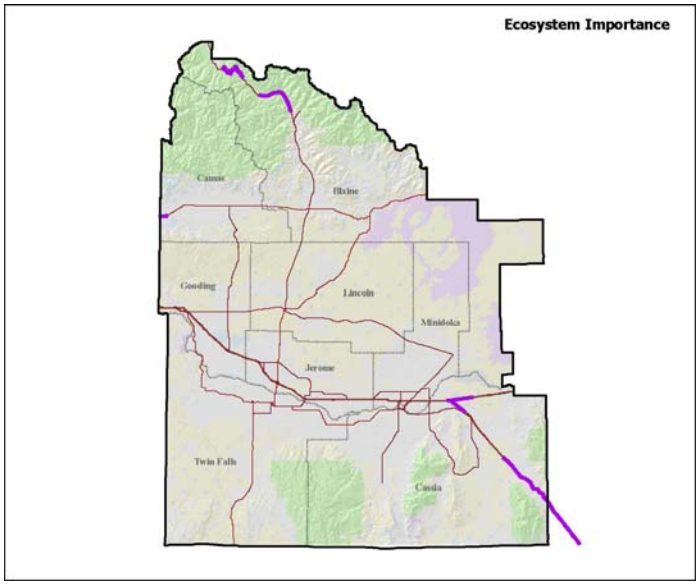


Figure 7. District 4 Linkage Areas of Ecosystem Importance



ITD District 5 includes approximately 780 miles of federal and state highways. A total of 44 linkage areas were identified in ITD District 5, for a total of 290 miles of linear road segments. The ITD District 5 linkage areas include 7 linkage areas noted as having ecosystem importance and 32 linkage areas with local and/or regional importance.

Figure 8. District 5 Wildlife Linkage Areas

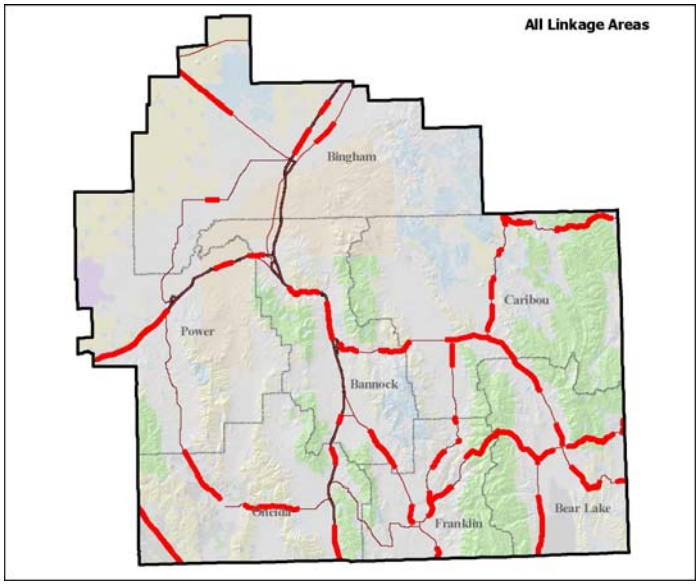
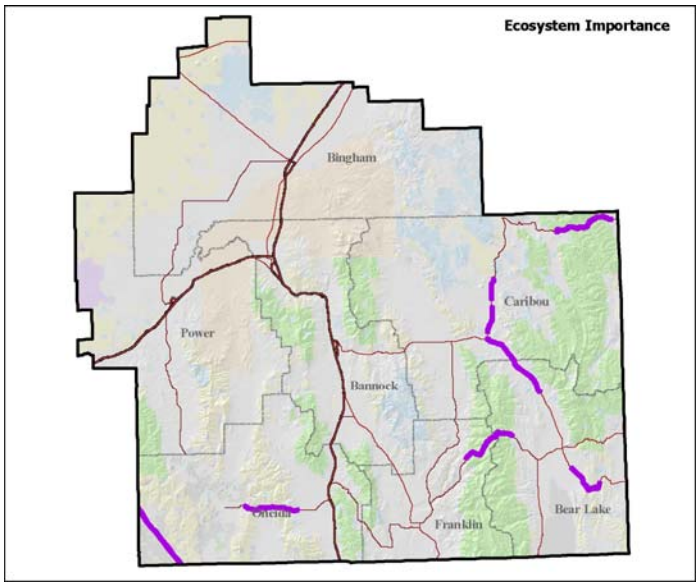


Figure 9. District 5 Linkage Areas of Ecosystem Importance



GIS Data, Analysis and Deliverables

There were two primary GIS processing tasks required prior to conducting the expert workshops on highway linkages: developing the base layers for reference in the meetings and creating the wildlife linkage model for reference during the workshops. The base layers typically involved deriving a subset of the digital data from a larger regional or national data layer for vector based layers and re-projecting as necessary for efficiency in display and analysis. The image base was provided by the Idaho Department of Fish and Game (IDFG) from National Aerial Imagery Program (NAIP) files.

The wildlife linkage models we have used in similar highway linkage studies did not exist for the project area. The data layers are described in detail in the Data Layers section. The GIS methodology is described in the Wildlife Linkage Modeling section and in Appendix D.

Data Layers

Amphibians and reptiles
Species of concern included frogs, salamanders, turtles, snakes, lizards. The Idaho Conservation Data Center (IDCDC) provided amphibian and reptile GIS data for use and display during the workshops. These species generally have limited mobility and can suffer high mortality when attempting to cross highways (Jochimsen, 2004).

Big game
Elk habitat data, from the Rocky Mountain Elk Foundation's (RMEF) Measure and Prioritize Habitat™, included data for winter, winter crucial, summer, and summer crucial range (developed at a scale of 1:250,000) was clipped for the expert workshops. Mule Deer data, from the Western Association of Fisheries and Wildlife Agencies – Mule Deer Working Group, included summer, winter, winter concentration, year round, other important, and limited habitat. These layers were for use and display during the workshops.

Digital Elevation Model (DEM)
Geodata used 10-30 meter resolution DEMs, obtained from the National Elevation Dataset (NED), to derive GIS layers used for visual display in the expert workshops. These included a shaded relief map, or hillshade, for visual display of terrain features

Fisheries
Fisheries data for threatened and endangered fish species was provided by IDCDC and IDFG. Geodata overlaid all perennial streams on the state and federal highway segments and created points at each intersection of the two layers. These points were assigned a unique identifier, and potential blockage locations were displayed

at the workshops, allowing participants the opportunity to identify additional suspected barrier locations.

Human Developed Sites

Large ungulate and carnivore wildlife species are influenced by the intensity of human activity around developed sites. Depending on the wildlife species involved, they may act negatively, positively or in a neutral fashion. Negative responses to avoid areas surrounding developed sites may result in habitat loss or fragmentation, and positive responses or attraction to developed sites due to the presence of foods can result in increased mortality and highway public safety concerns.

Human developed sites was used for the linkage model area of interest and as a resource layer for display in the workshops. For ITD District 5, IDFG provided cadastral data and documentation from counties in the linkage model area of interest. Geodata processed the available cadastral data, extracted the parcels with structures and mapped their location as parcel centroids. Human developed sites for Franklin County were generalized from a coarser land cover GIS layer.

The human developed site layer was composed of residential locations, structure locations, and public recreation points. Public recreation points (campsites, RV parks, etc.) typically do not exist in digital form and were digitized from USFS and BLM public map sources (typically at scales of approximately1:100,000). Table 1 includes the full list of the type of human developed sites mapped for the linkage model.

Table 1. Type of Human Developed Site

Type of Human Developed Site (Human Influence Zone Classification)	GIS Source Layer
Bannock County (high)	Ban_build.shp
Bear Lake County (high)	Bearlake.shp
Caribou County (high)	Structures_idfg.shp
Oneida County (high)	April2407.shp
Idaho Structures Building-CL-2-Large (high) Building-CL-2-Small (high) Building-Small (high) Campground – F.S. (high) Campground – Non-F.S. (high) Church (high) Forest – Other-Facility (high) Gaging-Station (low) Grave-Cross (low) Located/Landmark-Object (low) Mine-Shaft (low) Prospect (low) Tanks-Small (low) Well-Excluding-Water (low)	Idahostructures.shp

Recreation Sites Boat launch (low) Campground (high) Fish hatchery (high) Fishing access (low) FS Facility (high) Picnic (medium) Picnic/Boat Launch (medium) Point of Interest (medium) Ranger Station (high) Rest Area (medium) Trailhead (low)	BLM Surface Management Status maps: Malad City Soda Springs Preston Pocatello Caribou-Targhee National Forest maps: Montpelier & Soda Springs Ranger Districts Westside Ranger District

Imagery
IDFG provided 1-meter resolution orthophotos, based on the National Agricultural Imagery Program (NAIP). Although these are not land cover GIS layers, they provide detailed images of local vegetative patterns. Identification of hiding cover within a four mile distance of the highway is plainly visible and easily accomplished and was used extensively in the expert workshops.

ITD District Boundaries
District boundaries were downloaded from ITD and used in mapping and analysis. Linkage areas were recorded based on the workshop location, i.e. all linkage areas identified in the District 4 workshop were coded as District 4 linkage areas. For example, part of Interstate 84 is in the southwest corner of ITD District 5, but it was identified at the District 4 workshop. Thus, this linkage area is identified as ID4-11, even though part of the linkage area is in ITD District 5.

Land Cover
The National Land Cover Data **(**NLCD) layer was available as a backdrop for general reference and orientation during the expert workshops. We prepared a grid of the NLCD for the project area for general reference and for use as the source for the cover/non-cover inputs for the wildlife linkage model (see the section on the linkage model for more details on this portion of the process).

Mileposts
ITD provided highway milepost data, allowing time for Geodata to utilize this layer in preparing base maps for wildlife-vehicle collision expert mapping prior to the workshops. This has been the preferred locational and orientation aid for highway department road maintenance personnel that participate in the workshops.

Protected lands
IDFG provided protected land GIS data for use and overlay during workshops. Protected lands that are not available in digital GIS format will not be digitized, but will be noted in field notes and comments collected during the workshops.

Public land ownership
Public land ownership was downloaded from the BLM. Like most western states, public land ownership GIS layers, this layer is not updated regularly and may not be accurate in all locations, but it provides a generally accurate ownership map for expert workshop participants. The majority of the counties in the study area do not have cadastral parcel maps prepared in consistent digital format to provide private land parcels, so the public land layer provided the primary source on land ownership.

Public land survey system
Geodata used the Idaho 1:100,000 scale public land survey system (PLSS) as a reference layer for workshop participants. The sections were auto-labeled to facilitate orientation.

Railroads
Railroads are important because they almost always compound habitat connectivity and increase mortality. The presence of high volume railroad tracks along highways can reduce effectiveness of highway mitigation measures. IDFG provided available digital versions of railroad tracks to be used in the expert workshops.

Roads
Major state and federal highways and highway bridges were provided by ITD for use and display during the workshops. There were approximately 2,700 miles of state and federal highways in the project area (see Figures 1-3).

Road data from the Caribou National Forest and StreetMap USA were combined for the linkage model. A road density map layer was derived from the road layer as part of the linkage model and used in a "moving circle analysis" (Servheen, 2001).

Streams and Rivers and Lakes
Perennial streams were extracted from the 1:100,000 National Hydrologic Data (NHD) layers downloaded from USGS. The primary use of streams and rivers was for orientation and quick visual location by experts in the workshops. This layer was also displayed occasionally in the workshops to fill in areas where National Wetland Inventory data were not available, when inquiries were made regarding wetlands. NHD waterbodies were downloaded from USGS and waterbodies greater than 30 hectares were selected for use during the workshops.

Threatened and endangered species
IDFG and the IDCDC provided GIS layers of habitat and location of threatened and endangered species for use during the workshops.

Wetlands
IDFG provided the available National Wetland Inventory (NWI) data as a general reference layer in the expert workshops. NWI data was used to determine riparian areas in the linkage model.

Wildlife-vehicle accidents

Limited road kill data were summarized for key highway segments in the study area. The focus was on selected species of interest from a highway public safety perspective, primarily large ungulates and carnivores, The source of the data were ITD road maintenance staff and IDFG wildlife biologists. This data did not cover multiple years and was incomplete, but was useful as an additional reference layer for the expert workshops. ITD District maps were identified categories the number of road kill per year in high (>20), medium (5-20) or low (< 5) categories for groupings of ungulates, large carnivores and miscellaneous other species. This map layer was provided as a deliverable.

Wildlife Linkage Modeling

The wildlife linkage model we developed for the expert workshop in a selected area of ITD District 5 was based on methodology originally developed by Meitz (1994) and Servheen (2001). The model was targeted at large carnivores and ungulates, and identified linkage areas along highway corridors at a scale appropriate to the size of study area identified for this effort. The model included vegetation hiding cover, road density, riparian areas and human developed sites, and complemented the habitat fragmentation analysis required for other wildlife, serving as a surrogate for many other species. The model also identified areas where cooperation was necessary and where opportunities were greatest for wildlife benefits in coordination between transportation departments, public land managers, wildlife biologists, NGOs and private land owners. In addition to the final model, the derivative layers were also useful individually as reference layers in the expert workshop.

The process for the final linkage model combined the four input data layers (roads, human developed sites, cover conditions, riparian areas) and subsequently divided the results into four categories. In the “minimal” combined impact category, a given cell in the model had to have beneficial or neutral impact on all four individual layers or no more than one layer with a low impact value. The criteria progressed in this manner up through the low, moderate and high impact values (see description below). Details on this linkage model methodology are available in a report prepared by Chris Servheen, National Grizzly Bear Coordinator with the US Fish and Wildlife Service (2001) and in a thesis by Per Sandstrom (1996).

Linkage Model Tools

These tools are the modules of the Identification of Potential Linkages Zones model for large carnivores and ungulates. The tools were built in ESRI Modelbuilder, a component of Arcview 9 and provided as a deliverable for this project. The toolbox for the model and associated parameters can be optionally loaded along with the grid layers to re-run or tweak parameters of the model. Impacts of human activities and beneficial features of the landscape were considered. A rating system for each type of impact and vegetation condition was used to score each model component and then the values were combined

and classified into impact level categories of high, moderate, low, or minimal. The impacts and vegetation conditions considered were distance from roads, road density, human developed sites, riparian areas and hiding cover. While distance from roads was not applied directly to the final score it was used to define secure core areas which was then used to modify the rating of road density and hiding cover.

The following sections describe the primary components of the model. Refer to Appendix D for the detailed GIS steps implementing the model processes and flowcharts from Modelbuilder illustrating the relationships. The formal FGDC metadata, associated with each GIS layer and grid includes additional details on the model process and data layer documentation.

Hiding Cover

Extracted the cover types from the National Land Cover Data that could be considered as hiding cover. A 30 meter edge buffer was created that expanded the hiding cover areas. Finally, the hiding cover values were modified by their location either in or out of secure core areas (SCA). All areas, hiding, edge, or open were classified as hiding within secure core areas. Edge areas outside of a SCA were given an impact rating one level higher than hiding cover and open areas were given a rating of 2 levels higher than hiding cover.

Human Influence Zone

Defines Human Influence Zones around human developed sites. A high impact zone layer was generated by buffering all developed site point and polygon features. The high impact zone layer is the primary input for this tool, which then creates two additional impact zones around the high impact zone. These additional rings are then assigned medium and low impact values moving outward from the high impact zone.

Riparian

NWI data was used to determine riparian areas.

Secure Core Area

This tool generates the secure core areas (SCA) based on distance from selected roads and high use trails. The euclidian distance to the nearest road segment is calculated for each grid cell and then reclassified as either "In SCA" (greater than 500 meters from a road or high use trail), or "Out of SCA" (within 500 meters of a road or high use trail).

Total Motorized Access Routes

Uses a "moving window" analysis routine to calculate the road density in the one square mile (circular) area around each grid cell. The road density is then classified into 4 categories - 0 miles/sq. mile, 0.01 - 1 miles/sq mile, 1.01 - 2 miles/sq mile, and > 2 miles/sq mile. Impact values are assigned to each category and then modified based on

whether they are in or out of secure core areas (SCA). Impact values for areas out of SCA are increased by one level, and areas within an SCA retain the original value.

Combined Impacts

LZ Combined Impacts adds the impact values from the component models and classifies the resultant grid into impact categories of minimal (1), low (2), moderate (3), or high (4).
MINIMAL: In general, to be considered in the "minimal" combined impact category, the pixel had to have "neutral" or beneficial" impact values for all 4 individual layers, or only one condition have a "minimal" or "low" impact value.

4 beneficial or neutral
3 beneficial or neutral and 1 minimal or low

LOW: To be considered in the "low" combined impact category, 2 conditions could be in the "minimal" or "low" category, or 1 condition in the "minimal" or "low" category and/or 1 condition in the "moderate" category while the others had to be "beneficial" or "neutral".

2 minimal or low and 2 beneficial or neutral
1 minimal or low and 1 moderate and 2 beneficial or neutral
1 moderate and 3 beneficial or neutral

MODERATE OR HIGH: To be considered in the "moderate" or "high" combined impact category, the individual impact values had to be different combinations of "low", "moderate", and "high impact values

Project Deliverables

Project deliverables for this project included this final project report including maps of the linkage areas and documentation collected from biologists and other experts during the workshops. The physical model used to develop these grid layers was also a deliverable. The map layers include:

- Wildlife linkage model for a selected area of ITD District 5 and the five major subcomponents of the model, delivered in ArcInfo® grid file format
- Wildlife linkage areas on highway segments throughout the study area

Geodata provided support for four expert to develop linkage area maps for the project area and provide the content for the wildlife linkage assessment. The workshops followed a similar format and were each one day in duration. The workshops were attended by biologists and engineers from state, federal and local government agencies, and representatives of several non-governmental organizations

The nine original GIS data layers developed in the project were provided in the Idaho Transverse Mercator (IDTM) projection, a single-zone system that is widely accepted for use in the State of Idaho and is the state standard. The projection parameters for this standard are as follows:

Projection Name: Idaho Transverse Mercator NAD83 (IDTM83)

Units: meters
Datum: NAD83
Vertical Datum: NAVD88
Scale factor: .99960
Central Meridian: -114 00 00
Latitude of Origin: 42 00 00
False Easting: 2500000
False Northing: 1200000

Project Process and Participation

Project Methodology

Four expert workshops were held in ITD Districts 3, 4, and 5. All four workshops followed a similar format and were each one day in duration. Workshops were held in Pocatello, Jerome, Boise and McCall, Idaho. The workshops were attended by ITD biologists and engineers, and biologists from IDFG, the US Fish and Wildlife Service, Bureau of Land Management and the US Forest Service. Biologists from several non-governmental organizations also attended the workshops. A full list of participants in each workshop is provided in Appendix C.

The purpose of the workshops was to review data layers and collectively and individually identify areas of interest for wildlife linkage, review planned highway projects and anticipate other site specific issues related to wildlife habitat, public safety and other wildlife linkage topics. Workshop attendees had access to interactive GIS services to review data layers and model results, paper wall maps and other documentation. The expert workshops included interactive mapping as a group, supplemented by completion of documentation and worksheets, identification of whether each linkage area of interest was of ecosystem or local importance, and prioritization of areas of interest.

The general format for the workshops was as follows:

- General introductions of workshop participants and introduction to the process (including a PowerPoint presentation) and the data layers and maps available for the process (0.5 hrs).
- Presentation by ITD representative on highway improvement projects and maintenance opportunities in the appropriate sections of the project area (0.5 hrs).
- Presentation by IDFG representative on the statewide, web-based highway/ wildlife mortality database (0.5 hrs).
- Group review and discussion of individual highway segments with mile-by-mile summary and identification of key areas of interest. Group summary discussion of key wildlife issues and opportunities. Documentation by workshop participants in identified area of interest polygons. Identification of additional research and information needs, additional contacts, and issue delineation (4 hrs).

- Separate exercises were conducted to identify linkage polygons of local importance and those of national or international significance, and to prioritize linkage areas (1.5 hrs).
- Discussion of linkage mitigation strategies (1 hr).

The group discussed each highway segment sequentially, reviewed pertinent model results and underlying maps and data layers, mapped linkage areas, and documented the linkage attributes. Geodata provided support for the group, displayed information on request, digitized linkage areas of interest, and assisted in documentation and annotation.

Post Workshop Processing

Following each workshop, Geodata standardized the linkage areas recorded in the expert workshops, we placed a 500 meter buffer around each identified road segment. The comments recorded at the expert workshops were joined to each linkage area and are provided as part of the ArcView shapefile.

Documentation and Metadata

We prepared formal FGDC compliant metadata for the wildlife linkage model developed in the process and for the linkage area polygon layers. The metadata is provided in XML format.

References

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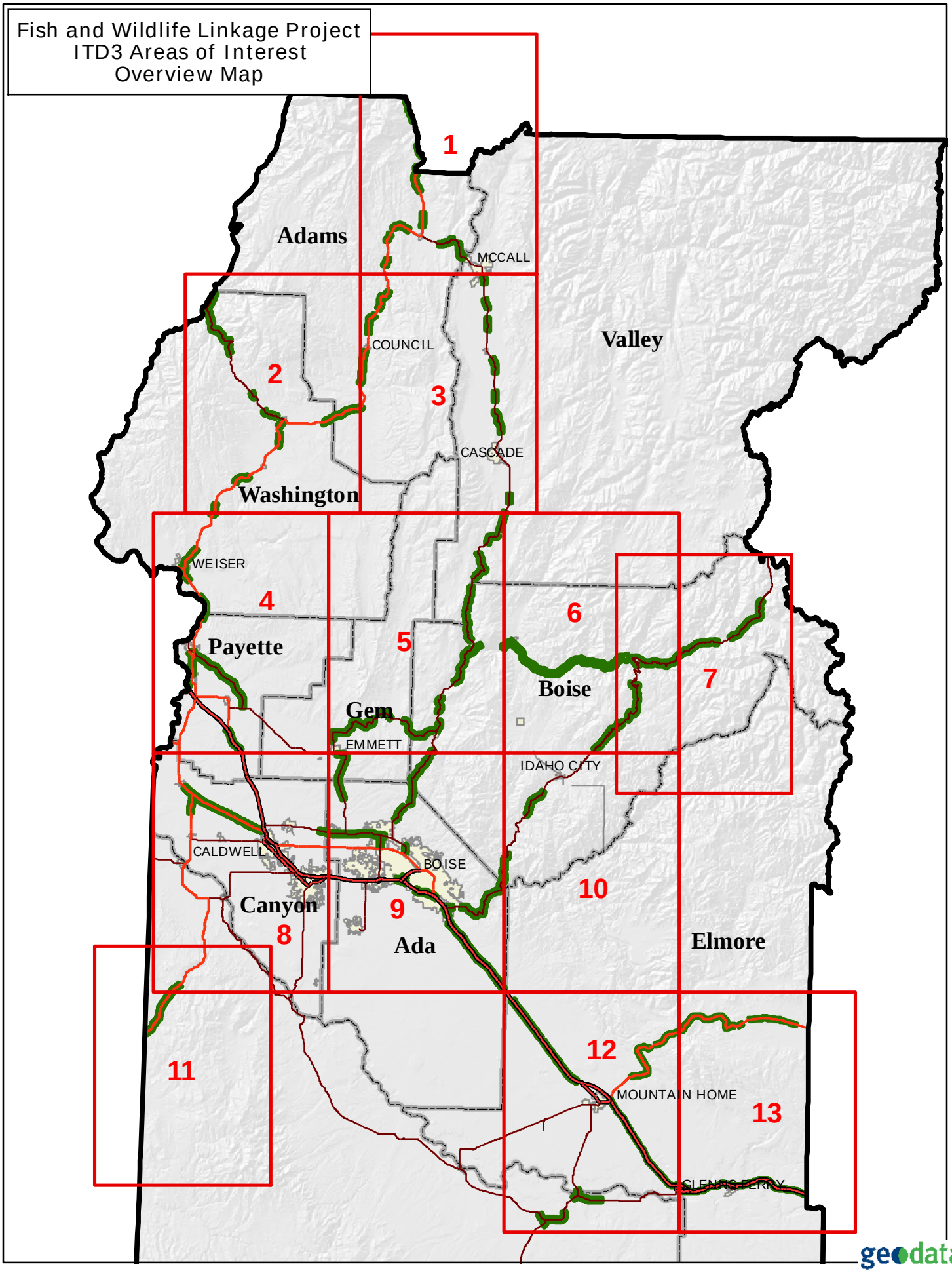
Servheen, C., J. Waller and P. Sandstrom. 2001. Identification and management of linkage zones for Grizzly Bears between large blocks of public land in the Northern Rockies. USFWS Manuscript. University of Montana.

Appendix A – Detailed Wildlife Linkage Area Maps


Fish and Wildlife Linkage Project
ITD3 Areas of Interest
Overview Map
1
2
3
4
5
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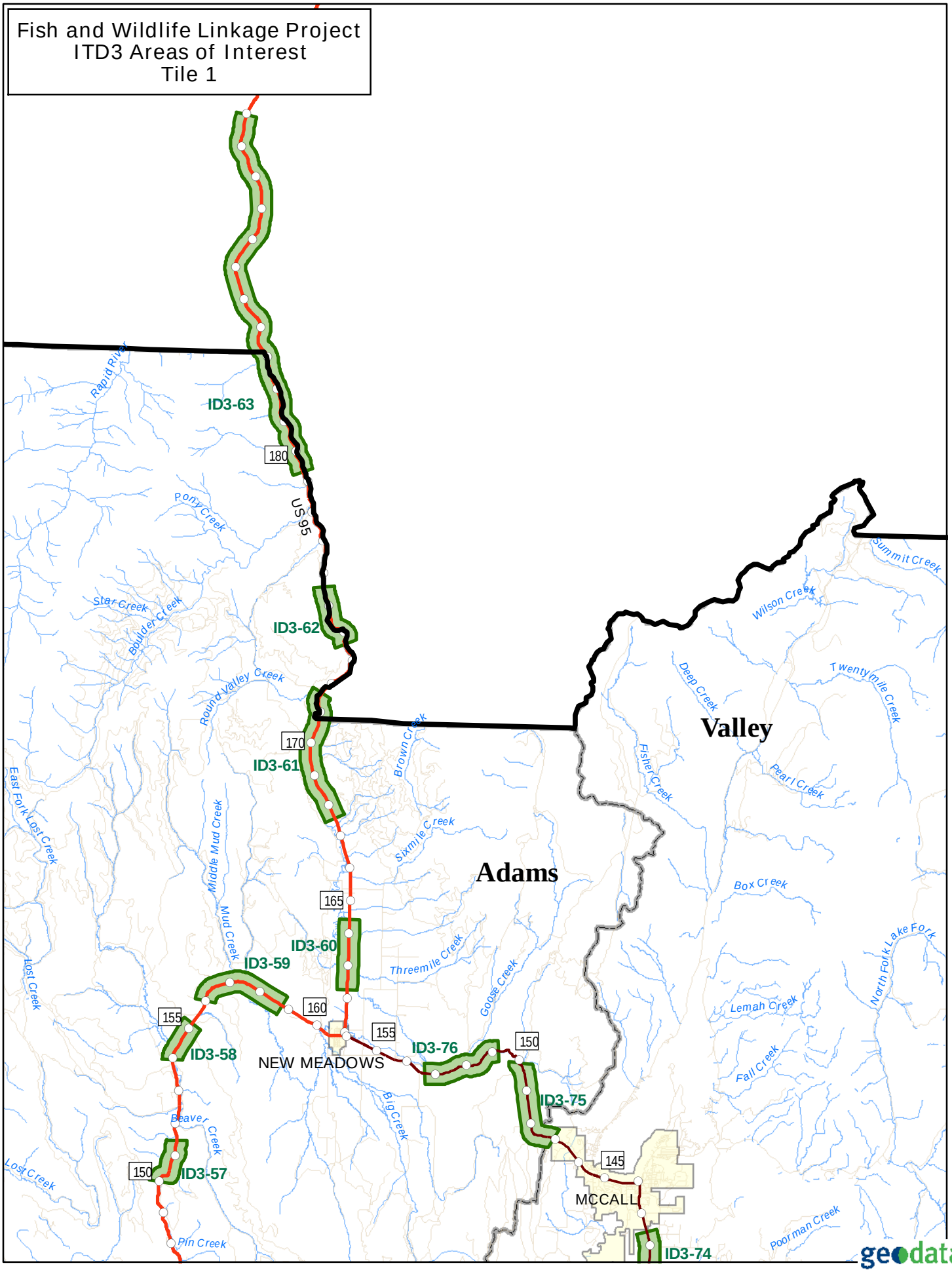
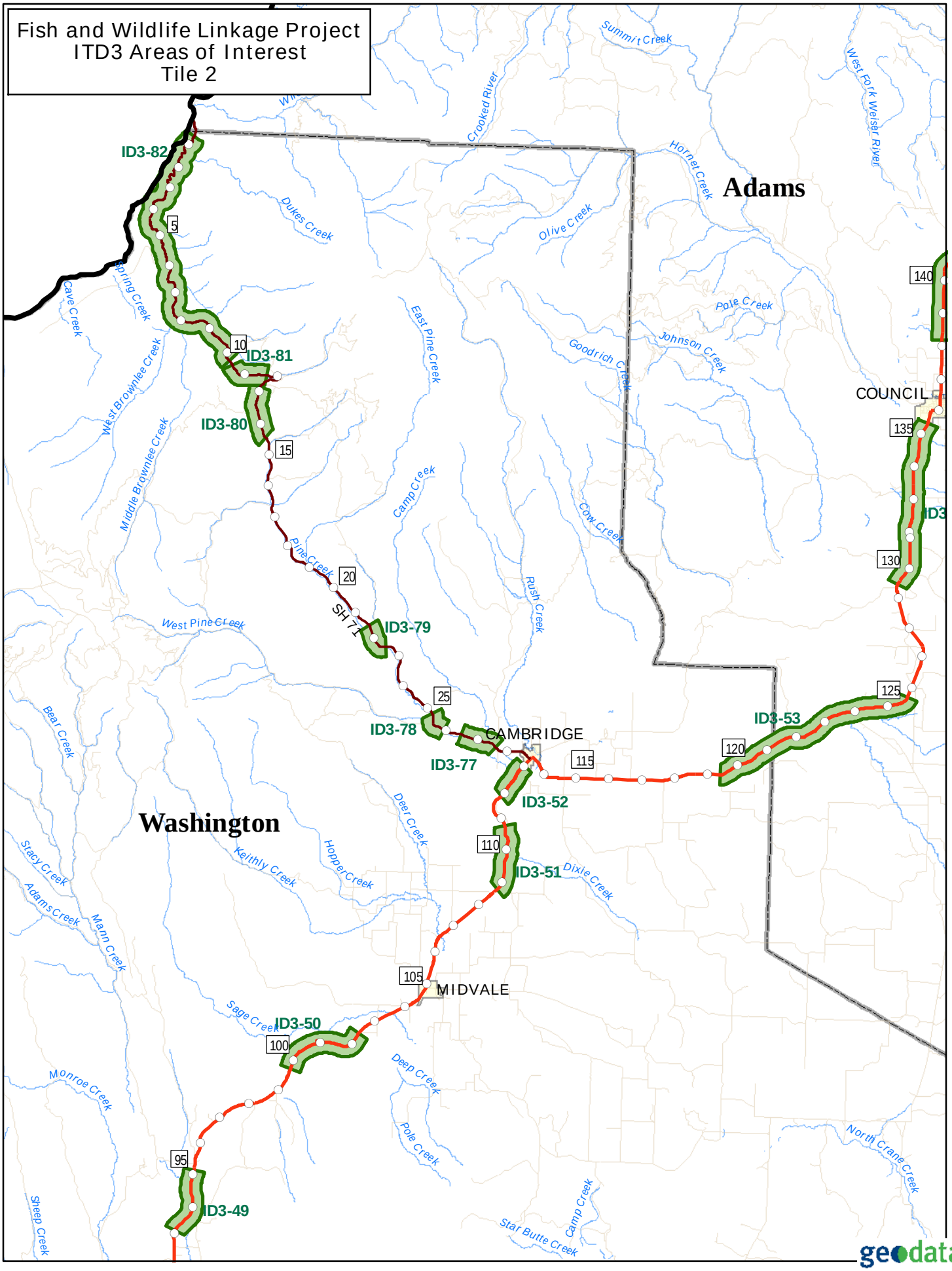
7
8
9
10
11
12
13
Adams
Valley
Washington
Payette
Gem
Boise
Canyon
Ada
Elmore
MCCALL
COUNCIL
CASCADE
WEISER
EMMETT
IDAHO CITY
CALDWELL
BOISE
MOUNTAIN HOME
GLENNS FERRY
geodata


Fish and Wildlife Linkage Project
ITD3 Areas of Interest
Tile 1
ID3-63
ID3-62
ID3-61
ID3-60
ID3-59
ID3-58
ID3-57
ID3-76
ID3-75
ID3-74
180
170
165
160
155
150
145
US 95
NEW MEADOWS
MCCALL
Adams
Valley
Rapid River
Pony Creek
Star Creek
Boulder Creek
Round Valley Creek
Brown Creek
Sixmile Creek
Middle Mud Creek
Mud Creek
East Fork Lost Creek
Lost Creek
Threemile Creek
Goose Creek
Big Creek
Beaver Creek
Pin Creek
Summit Creek
Wilson Creek
Deep Creek
Twentymile Creek
Fisher Creek
Pearl Creek
Box Creek
North Fork Lake Fork
Lemah Creek
Fall Creek
Poorman Creek
geodata


Fish and Wildlife Linkage Project
ITD3 Areas of Interest
Tile 2
Adams
Washington
COUNCIL
CAMBRIDGE
MIDVALE
ID3-82
ID3-81
ID3-80
ID3-79
ID3-78
ID3-77
ID3-52
ID3-51
ID3-50
ID3-49
ID3-53
ID3
SH 71
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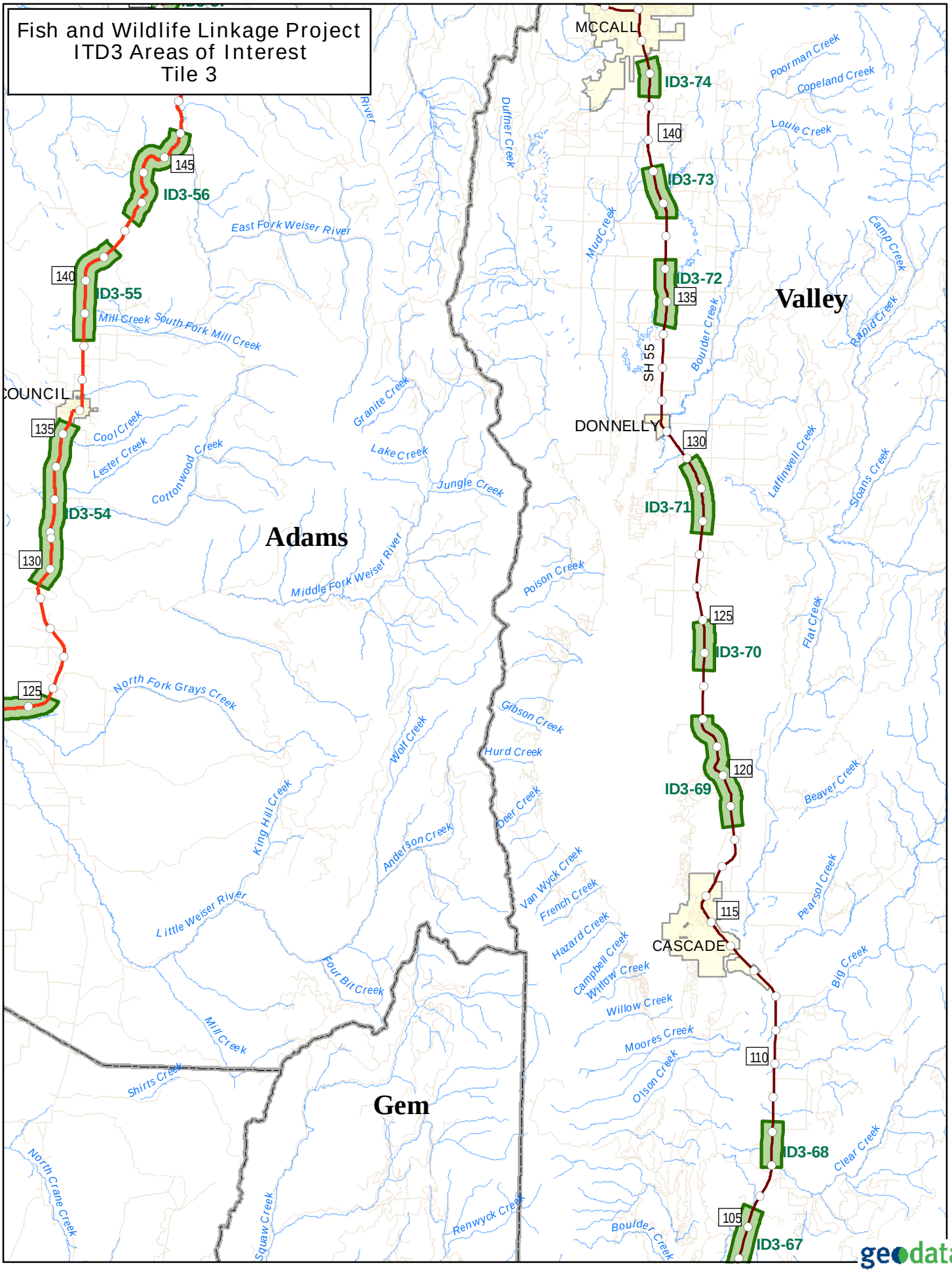
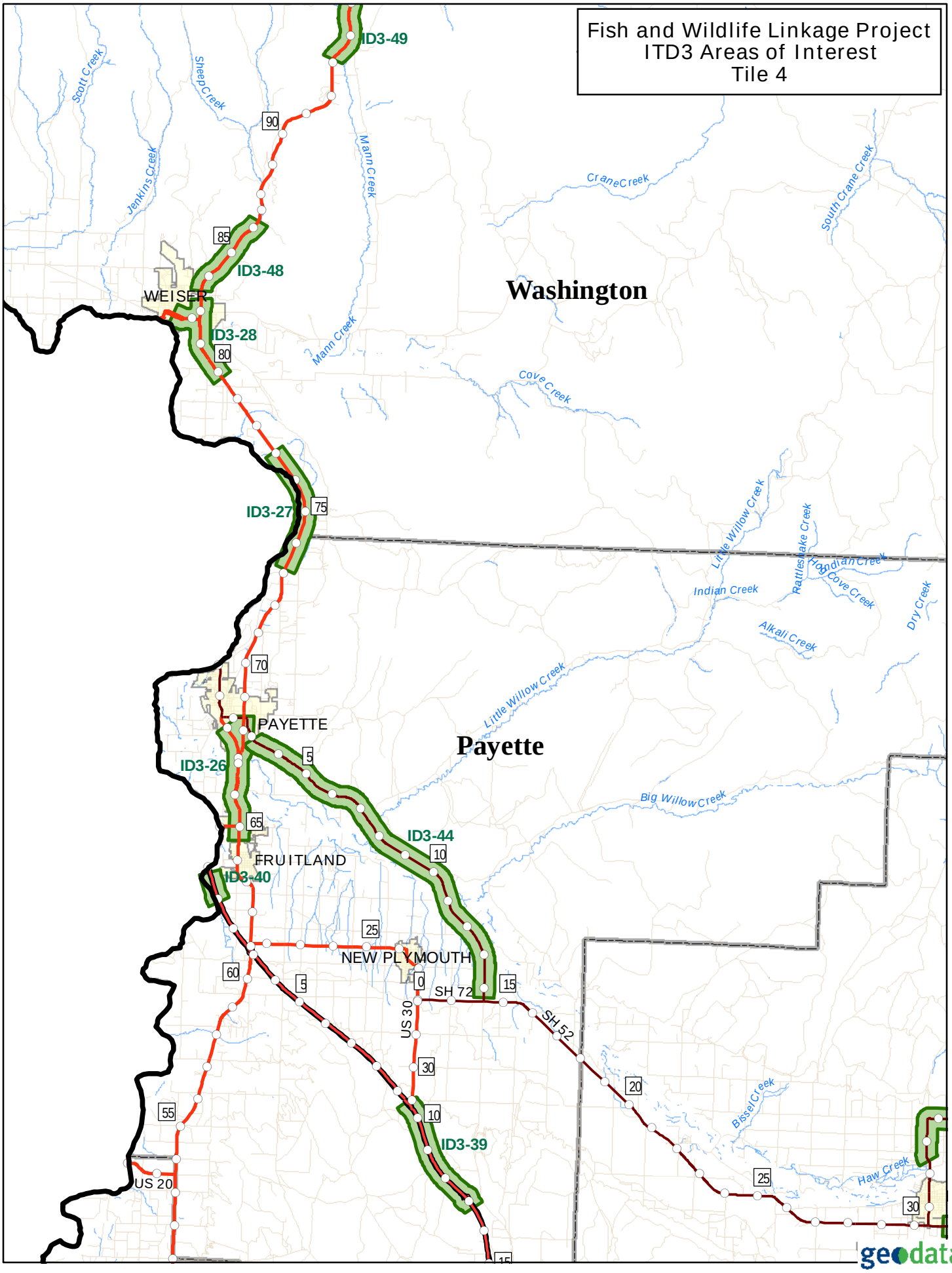
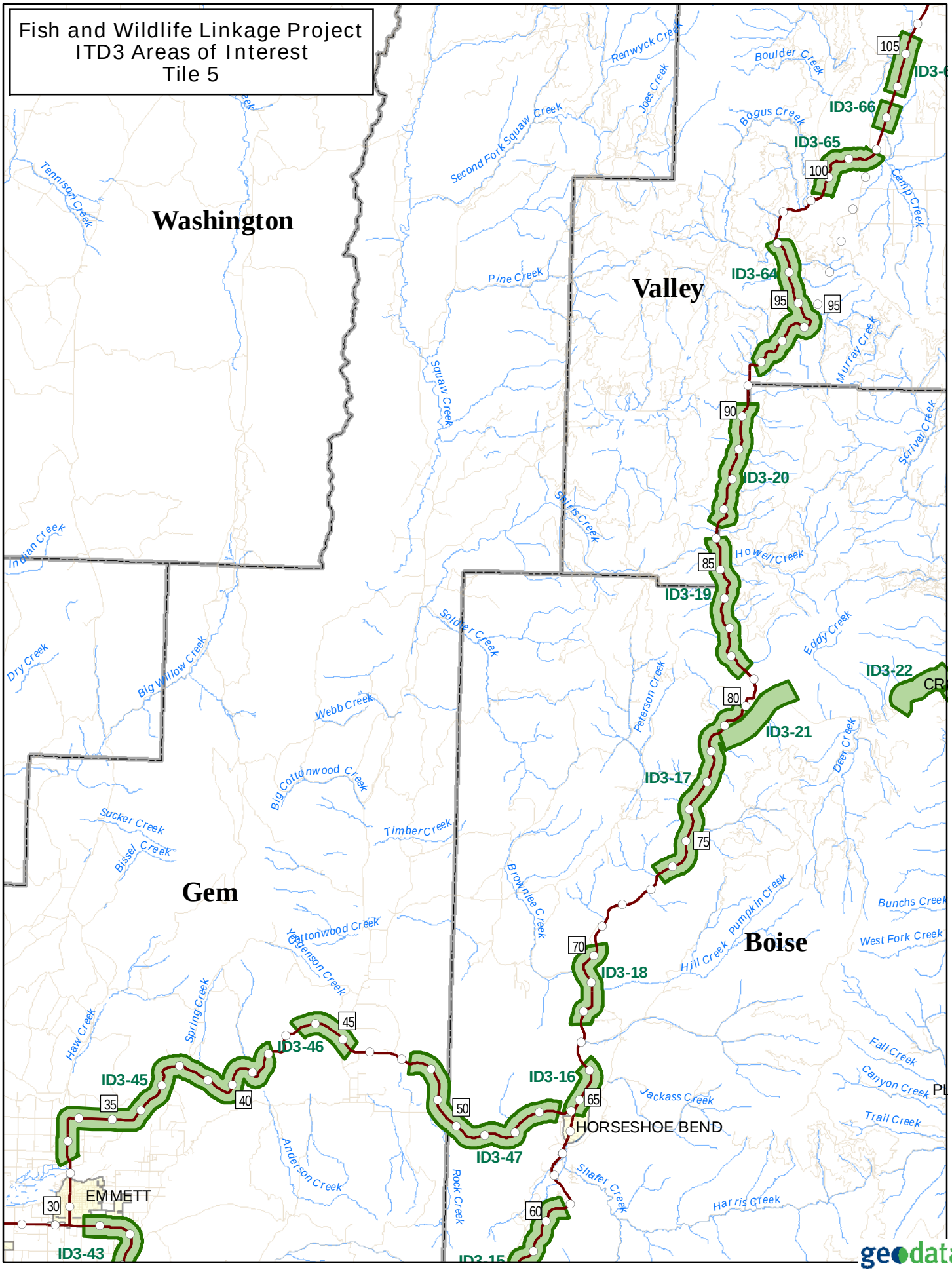
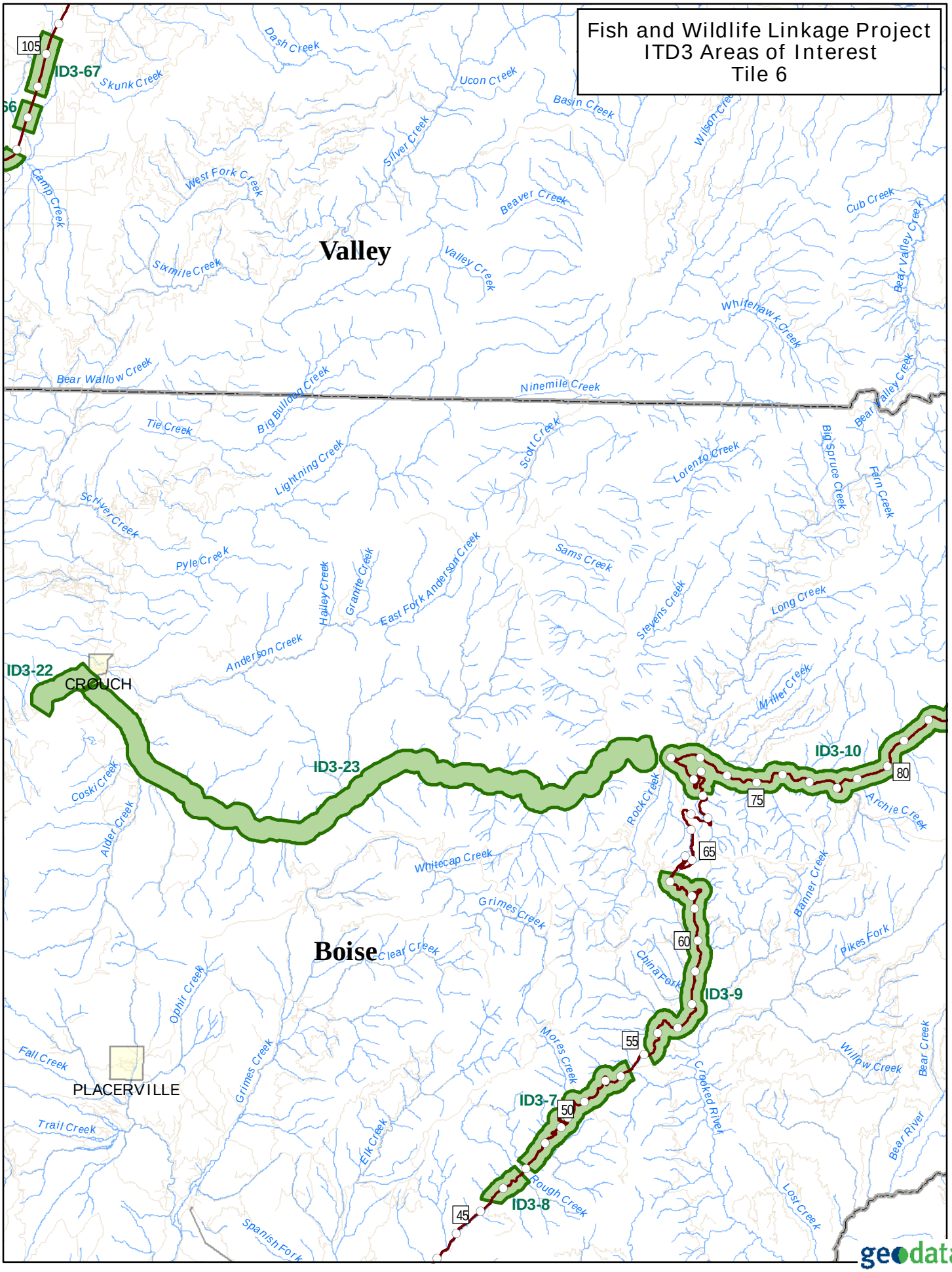
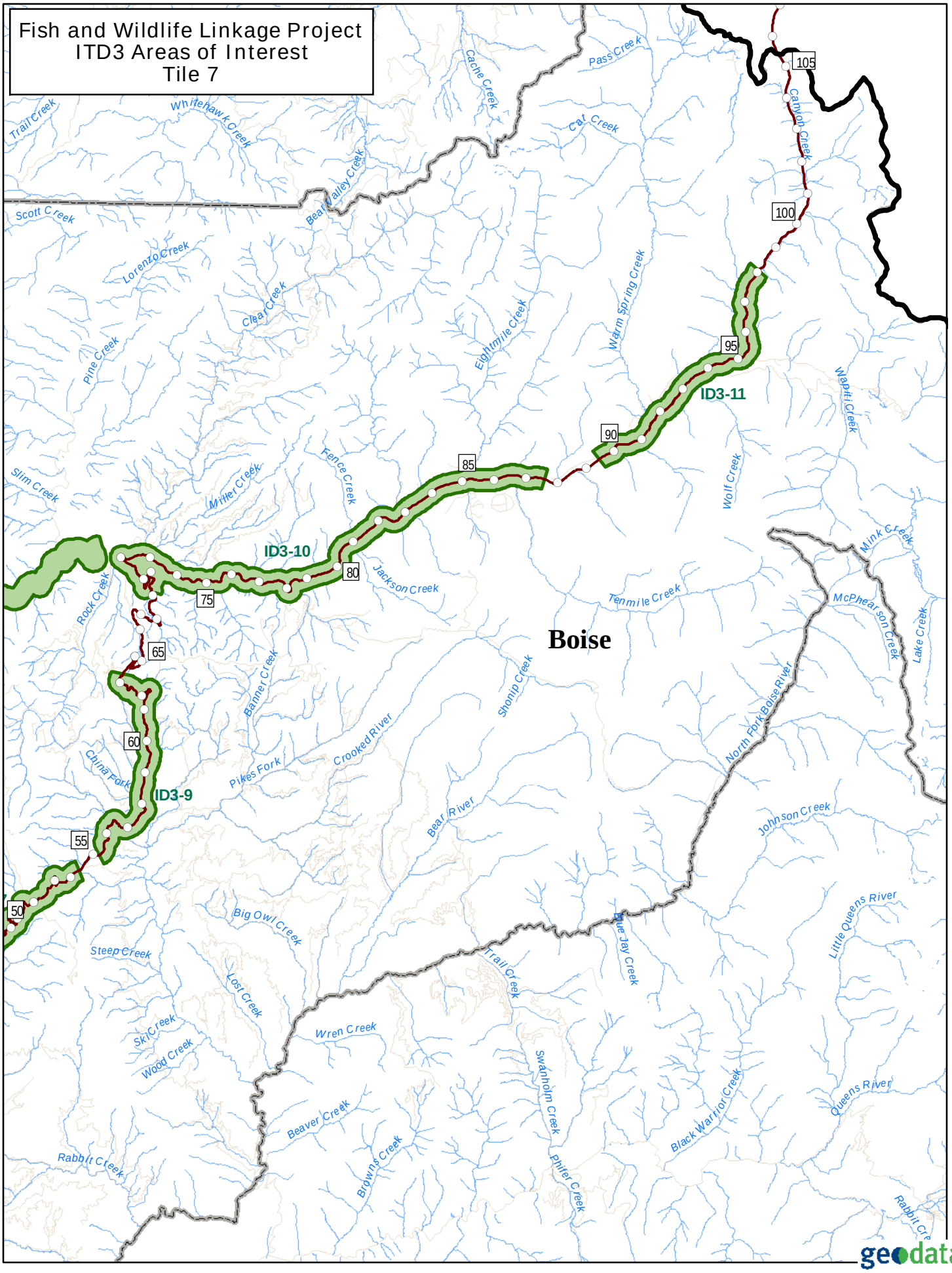
115
120
125
130
135
140
Summit Creek
Crooked River
West Fork Weiser River
Hornet Creek
Dukes Creek
Olive Creek
Spring Creek
Cave Creek
East Pine Creek
Pole Creek
Johnson Creek
Goodrich Creek
West Brownlee Creek
Middle Brownlee Creek
Camp Creek
Cow Creek
Pine Creek
Rush Creek
West Pine Creek
Bear Creek
Deer Creek
Keithly Creek
Hopper Creek
Dixie Creek
Stacy Creek
Adams Creek
Mann Creek
Sage Creek
Deep Creek
Monroe Creek
Pole Creek
North Crane Creek
Sheep Creek
Star Butte Creek
Camp Creek
geodata

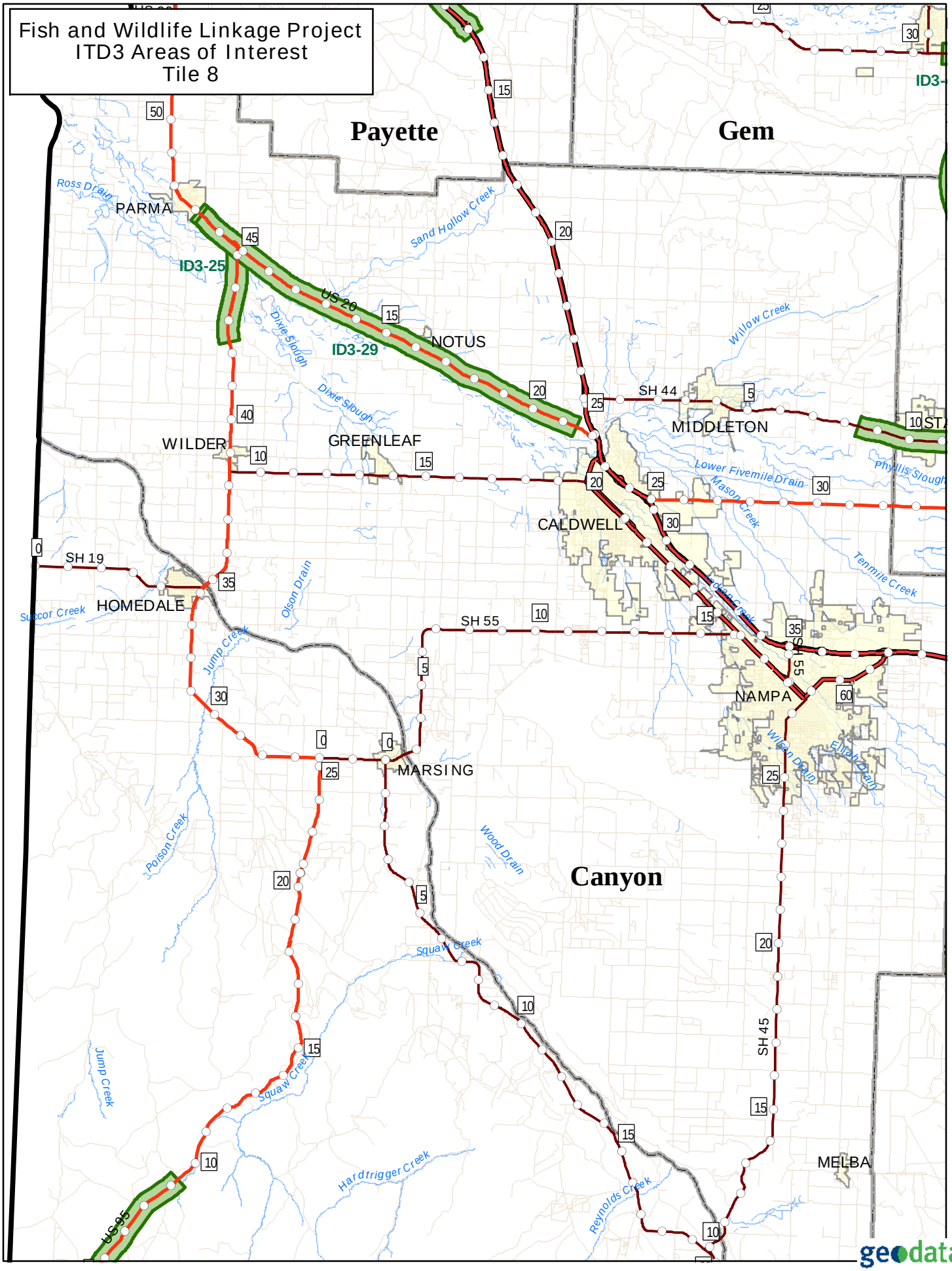

Fish and Wildlife Linkage Project
ITD3 Areas of Interest
Tile 3
MCCALL
COUNCIL
DONNELLY
CASCADE
Valley
Adams
Gem
ID3-74
ID3-73
ID3-72
ID3-71
ID3-70
ID3-69
ID3-68
ID3-67
ID3-56
ID3-55
ID3-54
145
140
135
130
125
120
115
110
105
SH 55
Poorman Creek
Copeland Creek
Louie Creek
Duffner Creek
Mud Creek
Camp Creek
Boulder Creek
Rapid Creek
Laffinwell Creek
Sloans Creek
Flat Creek
Beaver Creek
Pearsol Creek
Big Creek
Clear Creek
Boulder Creek
Renwyck Creek
Squaw Creek
North Crane Creek
Shirts Creek
Mill Creek
Four Bit Creek
Little Weiser River
King Hill Creek
North Fork Grays Creek
Anderson Creek
Wolf Creek
Gibson Creek
Hurd Creek
Deer Creek
Van Wyck Creek
French Creek
Hazard Creek
Campbell Creek
Willow Creek
Willow Creek
Moores Creek
Olson Creek
Poison Creek
Middle Fork Weiser River
Jungle Creek
Lake Creek
Granite Creek
Cottonwood Creek
Lester Creek
Cool Creek
Mill Creek
South Fork Mill Creek
East Fork Weiser River
River
geodata

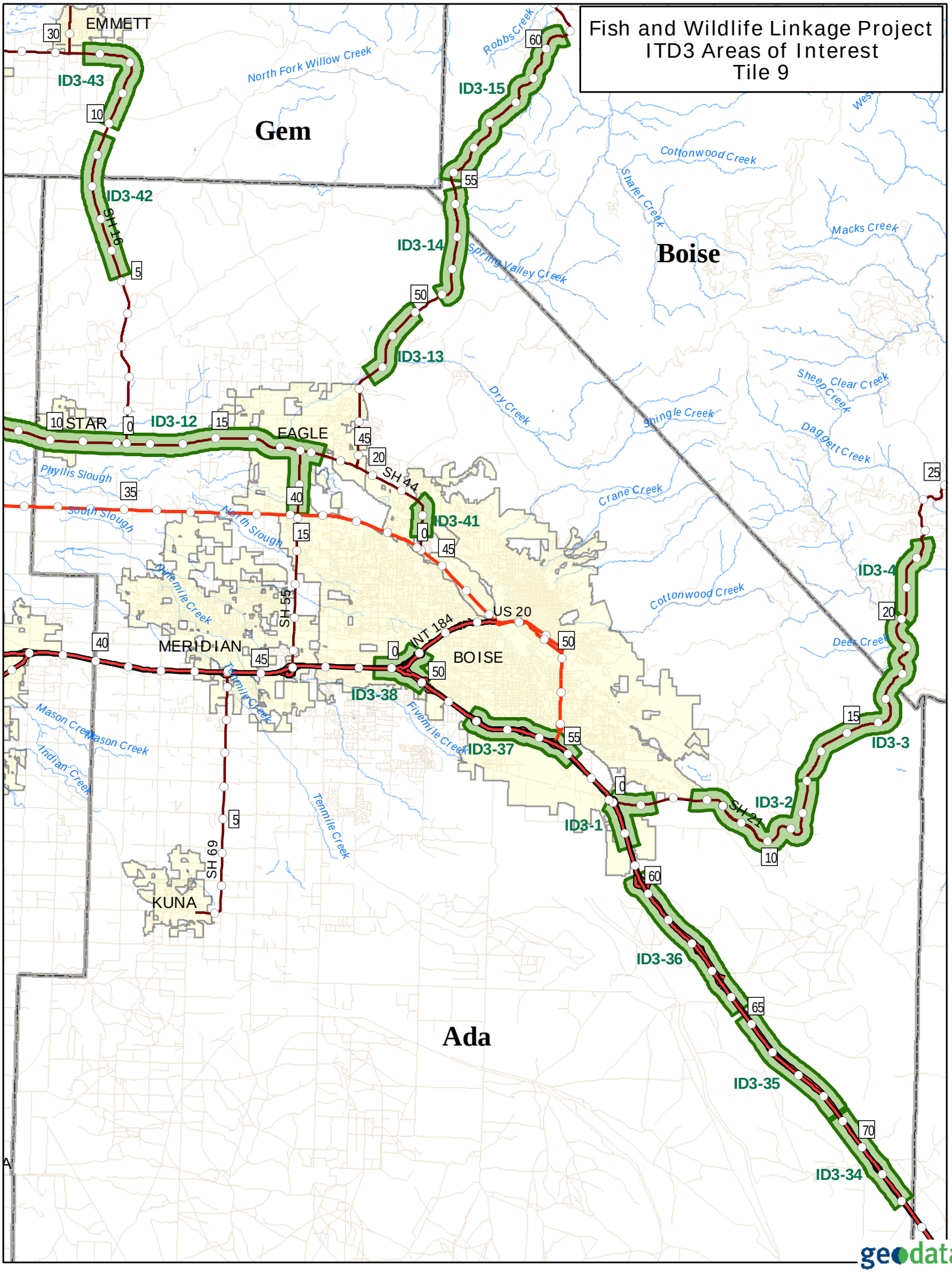

Fish and Wildlife Linkage Project
ITD3 Areas of Interest
Tile 4
ID3-49
ID3-48
ID3-28
ID3-27
ID3-26
ID3-44
ID3-40
ID3-39
WEISER
PAYETTE
FRUITLAND
NEW PLYMOUTH
Washington
Payette
Scott Creek
Sheep Creek
Jenkins Creek
Mann Creek
Crane Creek
South Crane Creek
Cove Creek
Little Willow Creek
Rattlesnake Creek
Indian Creek
Alkali Creek
Dry Creek
Big Willow Creek
Bissel Creek
Haw Creek
90
85
80
75
70
65
60
55
5
25
0
15
10
30
20
US 30
SH 72
SH 52
US 20
geodata

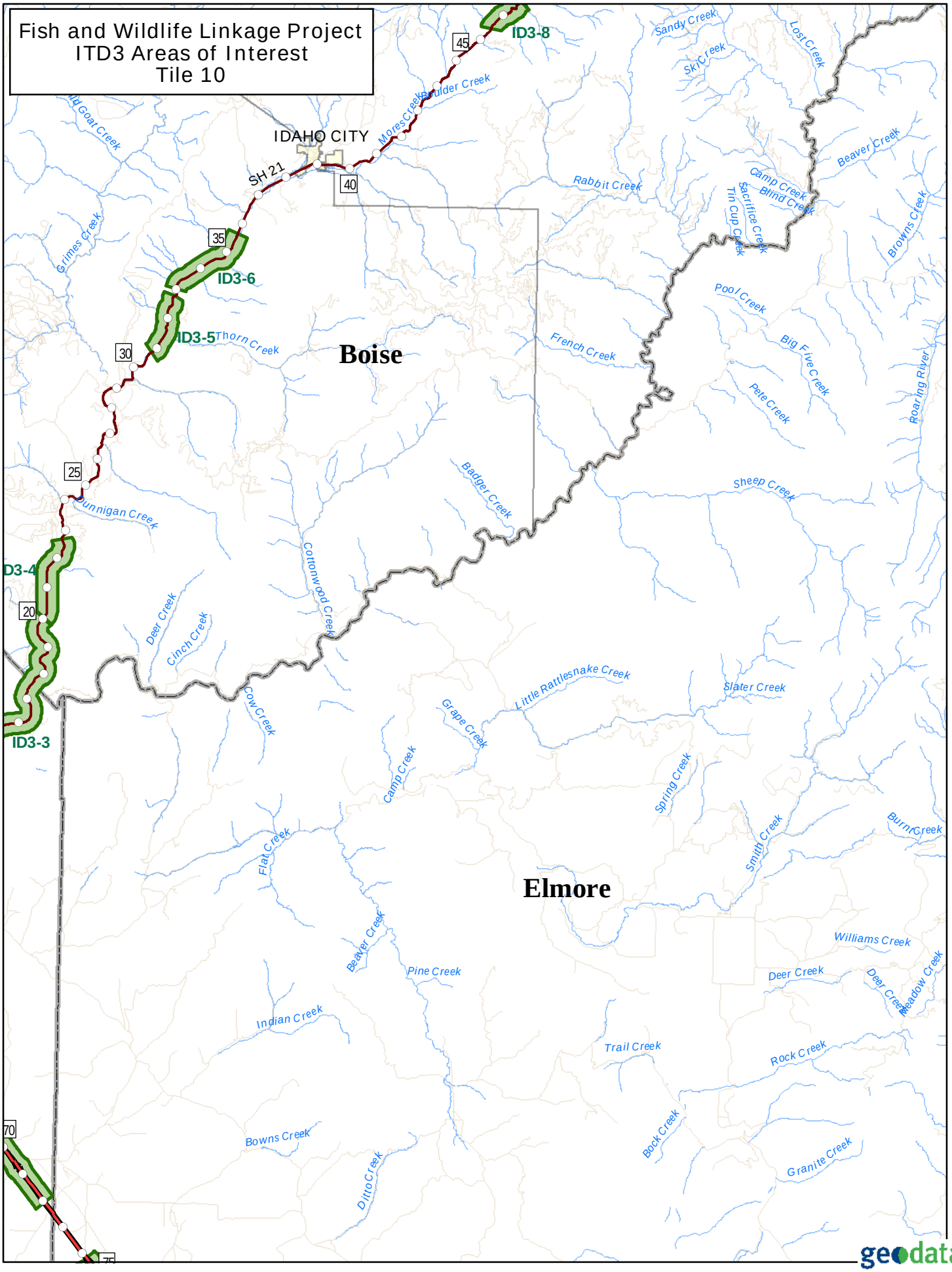

Fish and Wildlife Linkage Project
ITD3 Areas of Interest
Tile 5
Washington
Valley
Gem
Boise
ID3-66
ID3-65
ID3-64
ID3-20
ID3-19
ID3-22
ID3-21
ID3-17
ID3-18
ID3-16
ID3-47
ID3-46
ID3-45
ID3-43
ID3-15
105
100
95
95
90
85
80
75
70
65
60
50
45
40
35
30
HORSESHOE BEND
EMMETT
Renwyck Creek
Boulder Creek
Joes Creek
Bogus Creek
Second Fork Squaw Creek
Tennison Creek
Camp Creek
Pine Creek
Murray Creek
Squaw Creek
Scriver Creek
Sylvis Creek
Indian Creek
Howell Creek
Soldier Creek
Eddy Creek
Dry Creek
Big Willow Creek
Peterson Creek
Webb Creek
Deer Creek
Big Cottonwood Creek
Sucker Creek
Timber Creek
Bissel Creek
Brownlee Creek
Bunchs Creek
Pumpkin Creek
Cottonwood Creek
West Fork Creek
Hill Creek
Yoggenson Creek
Haw Creek
Spring Creek
Fall Creek
Canyon Creek
Jackass Creek
Trail Creek
Anderson Creek
Rock Creek
Shafer Creek
Harris Creek
geodata


Fish and Wildlife Linkage Project
ITD3 Areas of Interest
Tile 6
ID3-67
ID3-22
ID3-23
ID3-10
ID3-9
ID3-7
ID3-8
105
80
75
65
60
55
50
45
CROUCH
PLACERVILLE
Valley
Boise
Dash Creek
Skunk Creek
Ucon Creek
Basin Creek
Silver Creek
Wilson Creek
West Fork Creek
Camp Creek
Beaver Creek
Cub Creek
Bear Valley Creek
Sixmile Creek
Valley Creek
Whitehawk Creek
Bear Wallow Creek
Big Bulldog Creek
Ninemile Creek
Tie Creek
Lightning Creek
Scott Creek
Lorenzo Creek
Big Spruce Creek
Fern Creek
Scriver Creek
Pyle Creek
Hailey Creek
Granite Creek
East Fork Anderson Creek
Sams Creek
Stevens Creek
Long Creek
Anderson Creek
Miller Creek
Coski Creek
Alder Creek
Rock Creek
Archie Creek
Whitecap Creek
Grimes Creek
Banner Creek
Clear Creek
China Fork
Pikes Fork
Ophir Creek
Mores Creek
Fall Creek
Grimes Creek
Willow Creek
Bear Creek
Crooked River
Trail Creek
Elk Creek
Bear River
Rough Creek
Lost Creek
Spanish Fork
geodata

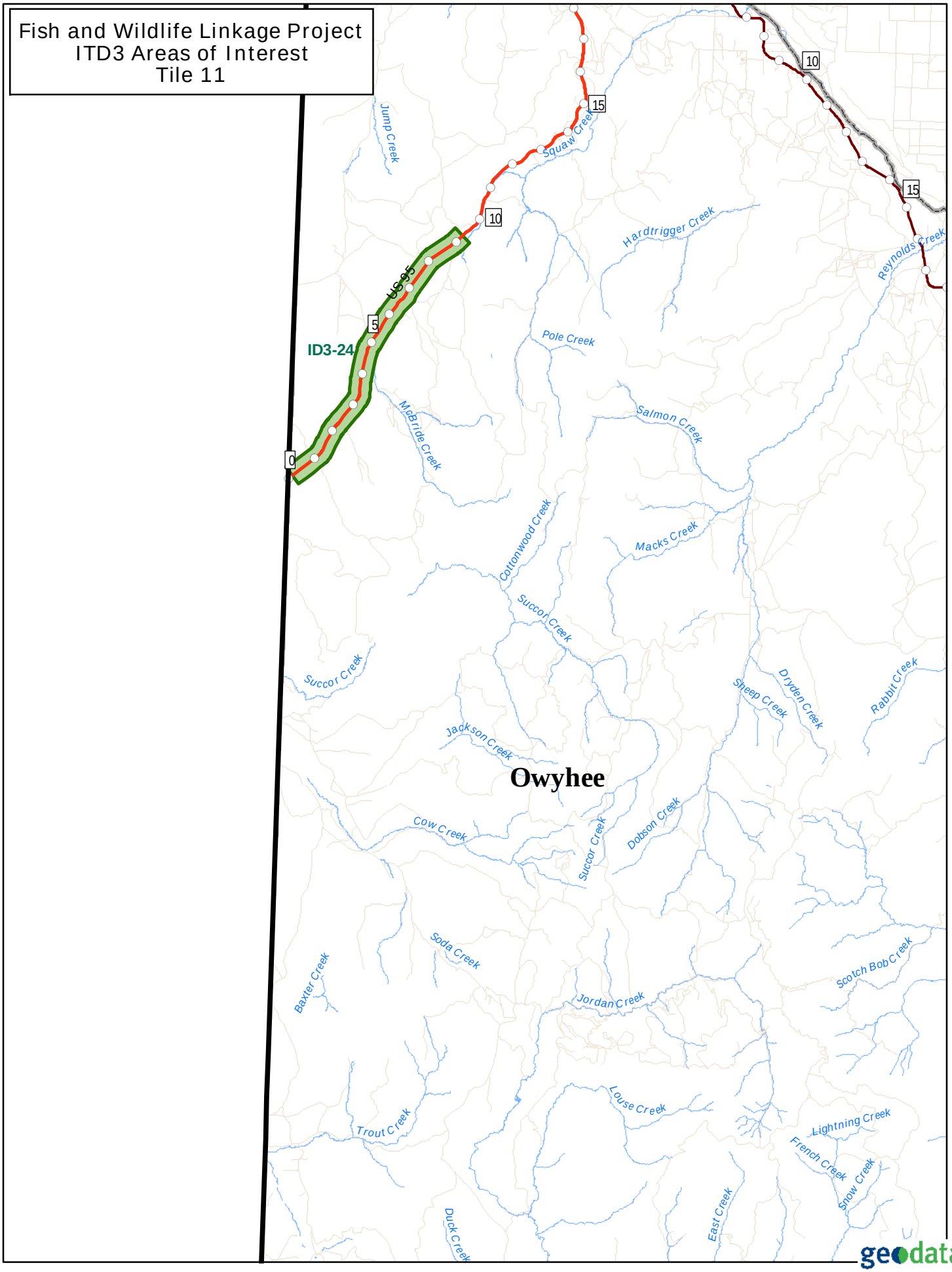

Fish and Wildlife Linkage Project
ITD3 Areas of Interest
Tile 7
ID3-9
ID3-10
ID3-11
Boise
50
55
60
65
75
80
85
90
95
100
105
Trail Creek
Whitehawk Creek
Cache Creek
Pass Creek
Cat Creek
Canyon Creek
Bear Valley Creek
Scott Creek
Lorenzo Creek
Clear Creek
Pine Creek
Eighmile Creek
Warm Spring Creek
Wapiti Creek
Slim Creek
Miller Creek
Fence Creek
Wolf Creek
Mink Creek
Rock Creek
Jackson Creek
Tenmile Creek
McPhearson Creek
Lake Creek
Banner Creek
Shoship Creek
North Fork Boise River
China Fork
Pikes Fork
Crooked River
Bear River
Johnson Creek
Big Owl Creek
Steep Creek
Lost Creek
Trail Creek
Blue Jay Creek
Little Queens River
Ski Creek
Wood Creek
Wren Creek
Swanholm Creek
Black Warrior Creek
Queens River
Beaver Creek
Browns Creek
Phifer Creek
Rabbit Creek
geodata


Fish and Wildlife Linkage Project
ITD3 Areas of Interest
Tile 8
Payette
Gem
Canyon
PARMA
NOTUS
WILDER
GREENLEAF
MIDDLETON
CALDWELL
HOMEDALE
NAMPA
MARSING
MELBA
ID3-25
ID3-29
US 20
SH 44
SH 19
SH 55
SH 45
US 95
Ross Drain
Sand Hollow Creek
Dixie Slough
Willow Creek
Lower Fivemile Drain
Mason Creek
Phyllis Slough
Tenmile Creek
Succor Creek
Olson Drain
Jump Creek
Poison Creek
Wood Drain
Squaw Creek
Hardtrigger Creek
Reynolds Creek
Wilson Drain
Elliott Drain
geodata


Fish and Wildlife Linkage Project
ITD3 Areas of Interest
Tile 9
Gem
Boise
Ada
EMMETT
STAR
EAGLE
MERIDIAN
BOISE
KUNA
ID3-43
ID3-42
ID3-15
ID3-14
ID3-13
ID3-12
ID3-41
ID3-38
ID3-37
ID3-1
ID3-2
ID3-3
ID3-4
ID3-36
ID3-35
ID3-34
SH 16
SH 44
SH 55
SH 69
SH 21
US 20
INT 184
North Fork Willow Creek
Robbs Creek
Cottonwood Creek
Shafer Creek
Macks Creek
Spring Valley Creek
Dry Creek
Shingle Creek
Sheep Creek
Clear Creek
Daggett Creek
Crane Creek
Phyllis Slough
South Slough
North Slough
Fivemile Creek
Tenmile Creek
Mason Creek
Indian Creek
Deer Creek
geodata


Fish and Wildlife Linkage Project
ITD3 Areas of Interest
Tile 10
ID3-8
ID3-6
ID3-5
ID3-4
ID3-3
IDAHO CITY
SH 21
Boise
Elmore
Sandy Creek
Lost Creek
Ski Creek
Boulder Creek
Moores Creek
Old Goat Creek
Grimes Creek
Rabbit Creek
Beaver Creek
Camp Creek
Blind Creek
Sacrifice Creek
Tin Cup Creek
Browns Creek
Pool Creek
Big Five Creek
Pete Creek
Roaring River
Thorn Creek
French Creek
Badger Creek
Sheep Creek
Dunnigan Creek
Cottonwood Creek
Deer Creek
Cinch Creek
Cow Creek
Little Rattlesnake Creek
Slater Creek
Grape Creek
Camp Creek
Spring Creek
Smith Creek
Burnt Creek
Flat Creek
Beaver Creek
Pine Creek
Williams Creek
Deer Creek
Meadow Creek
Indian Creek
Trail Creek
Rock Creek
Bowns Creek
Ditto Creek
Bock Creek
Granite Creek
45
40
35
30
25
20
70
75
geodata

Fish and Wildlife Linkage Project
ITD3 Areas of Interest
Tile 11



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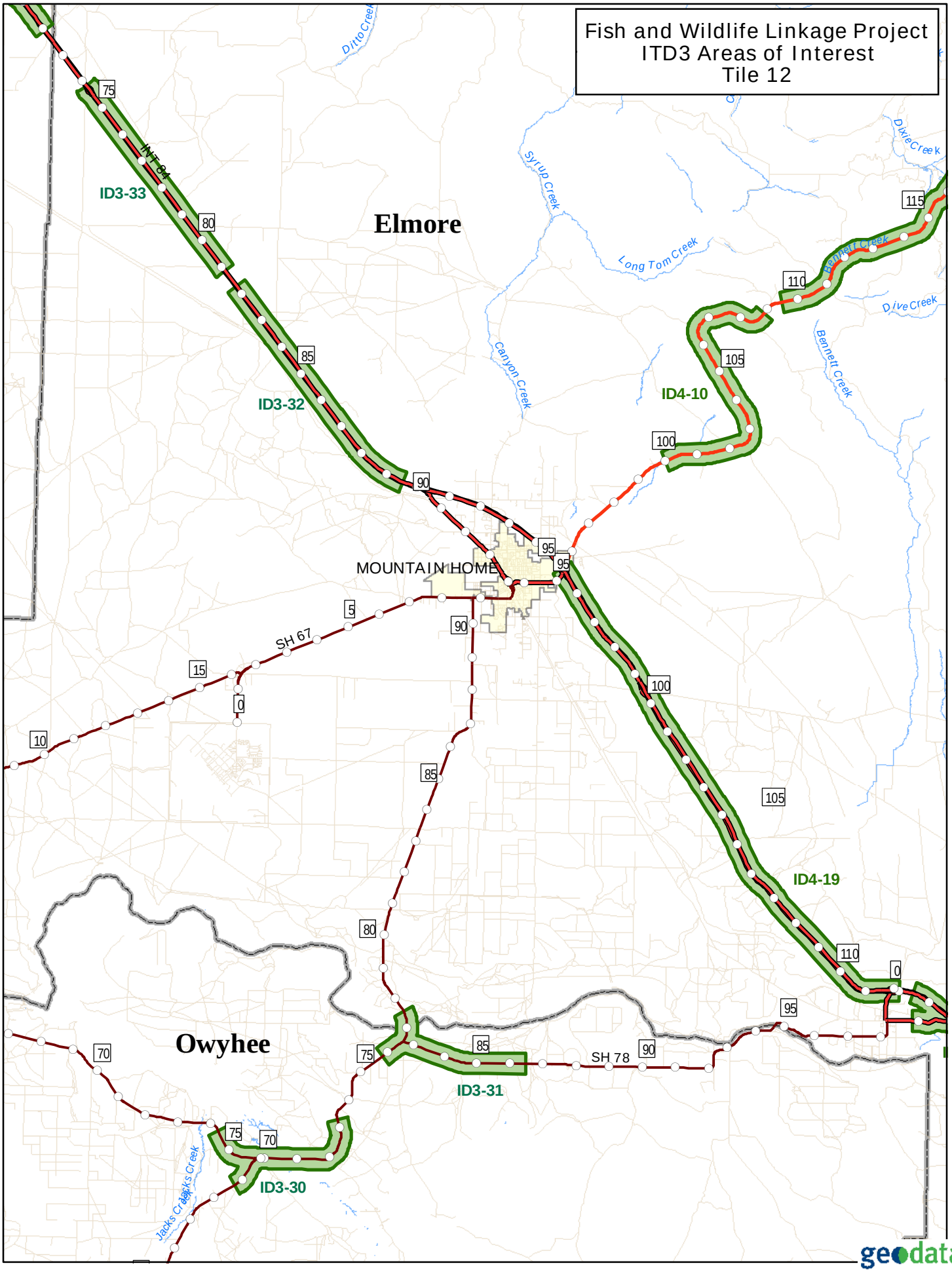
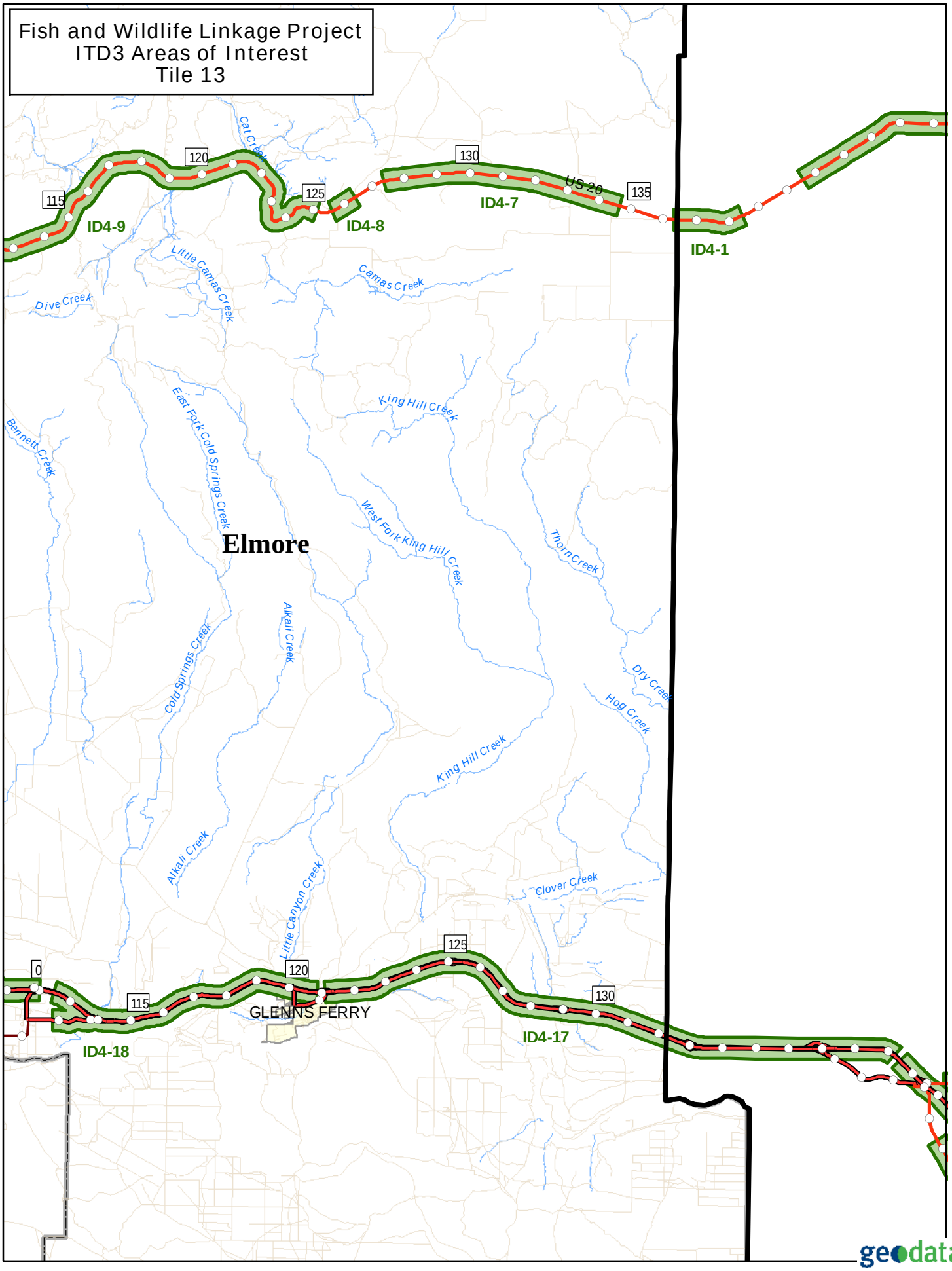
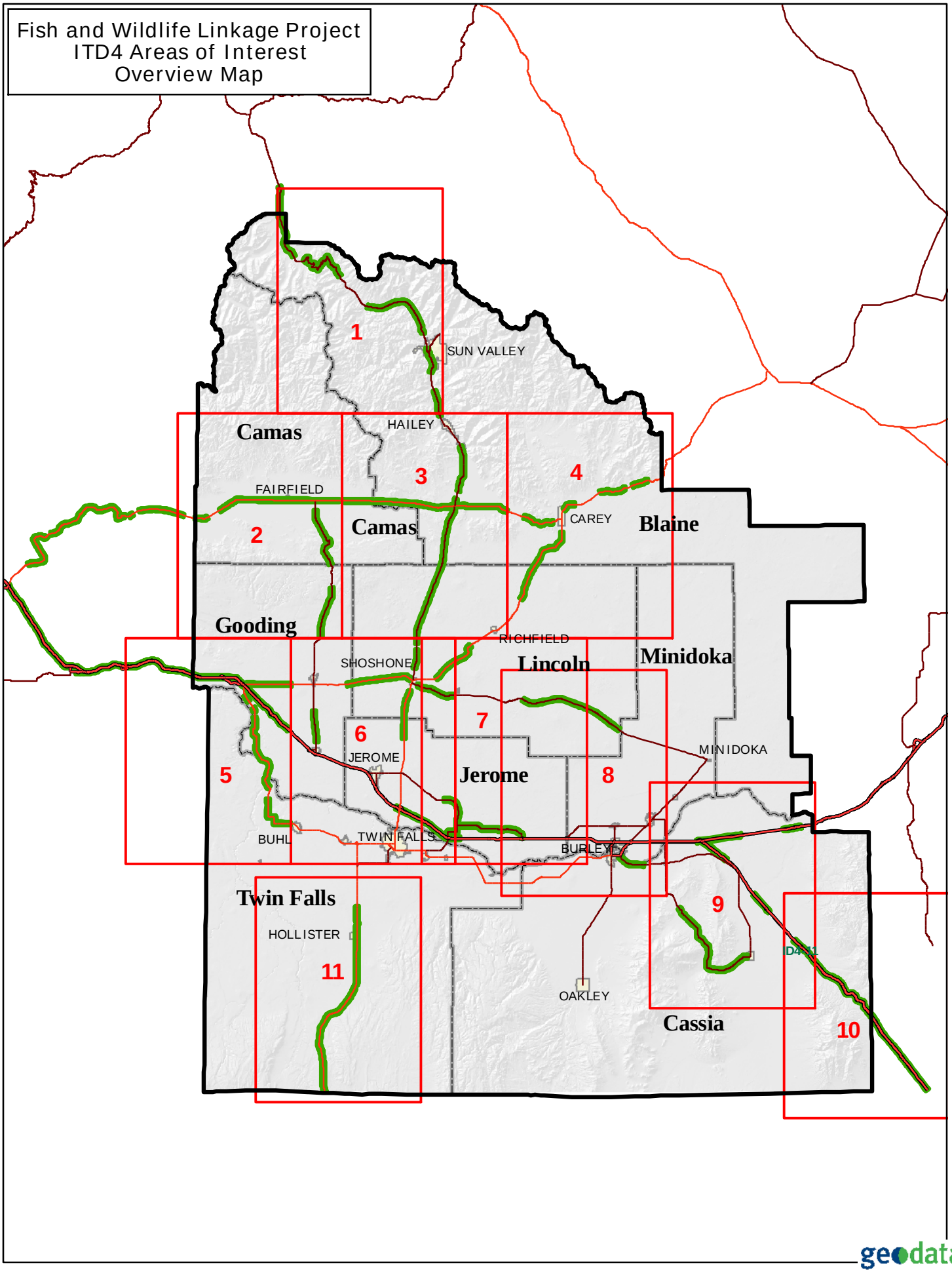
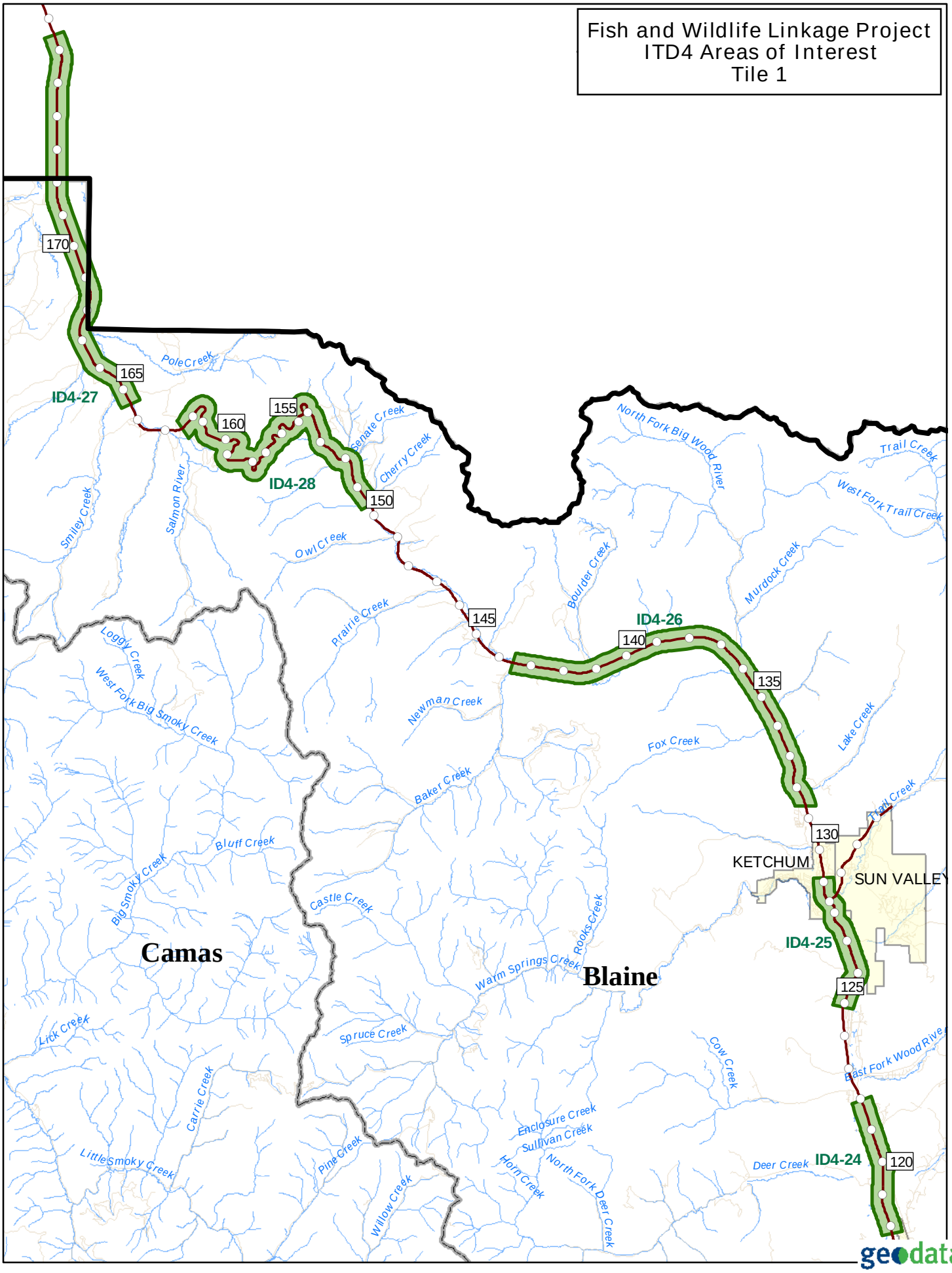
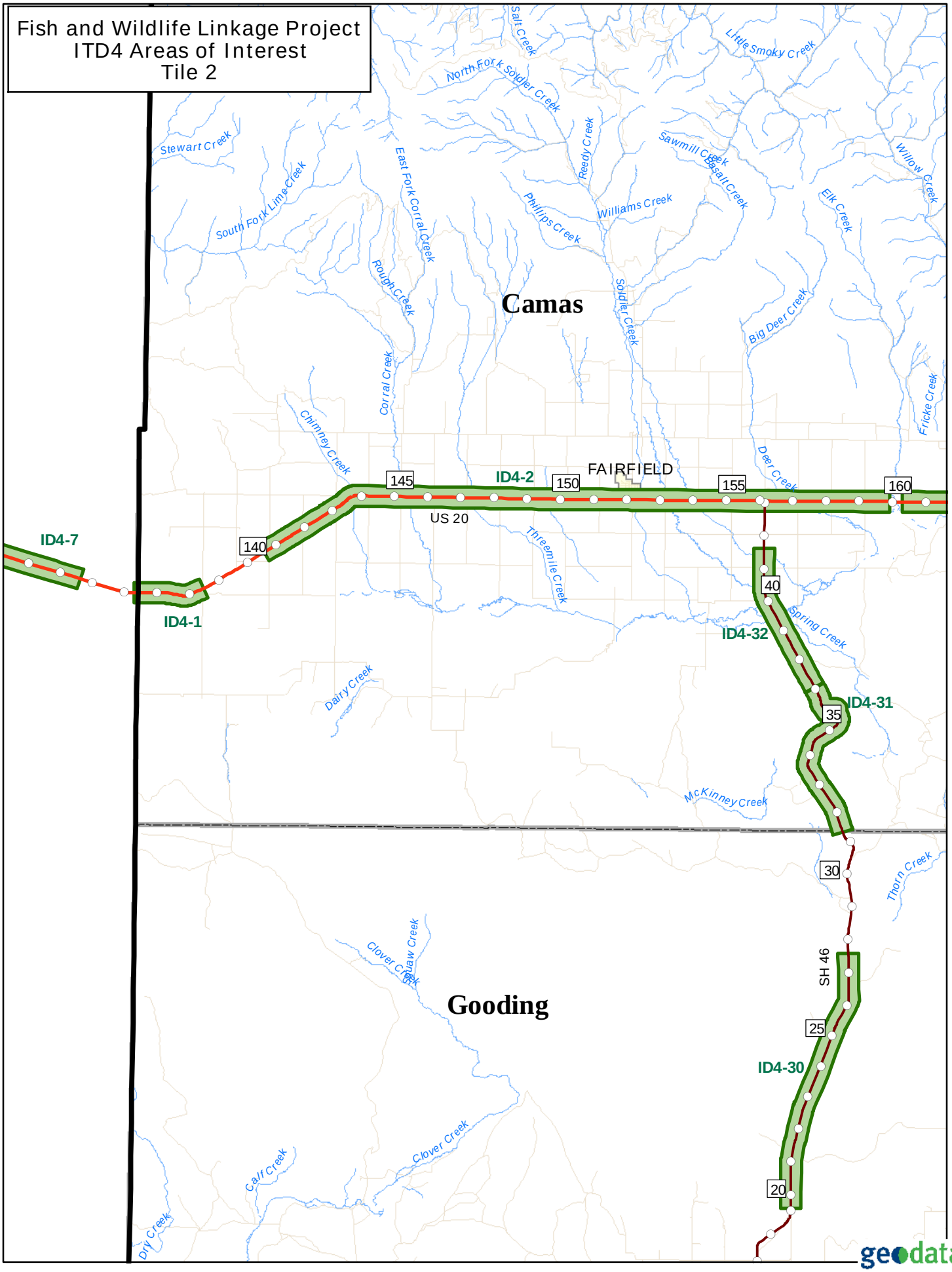
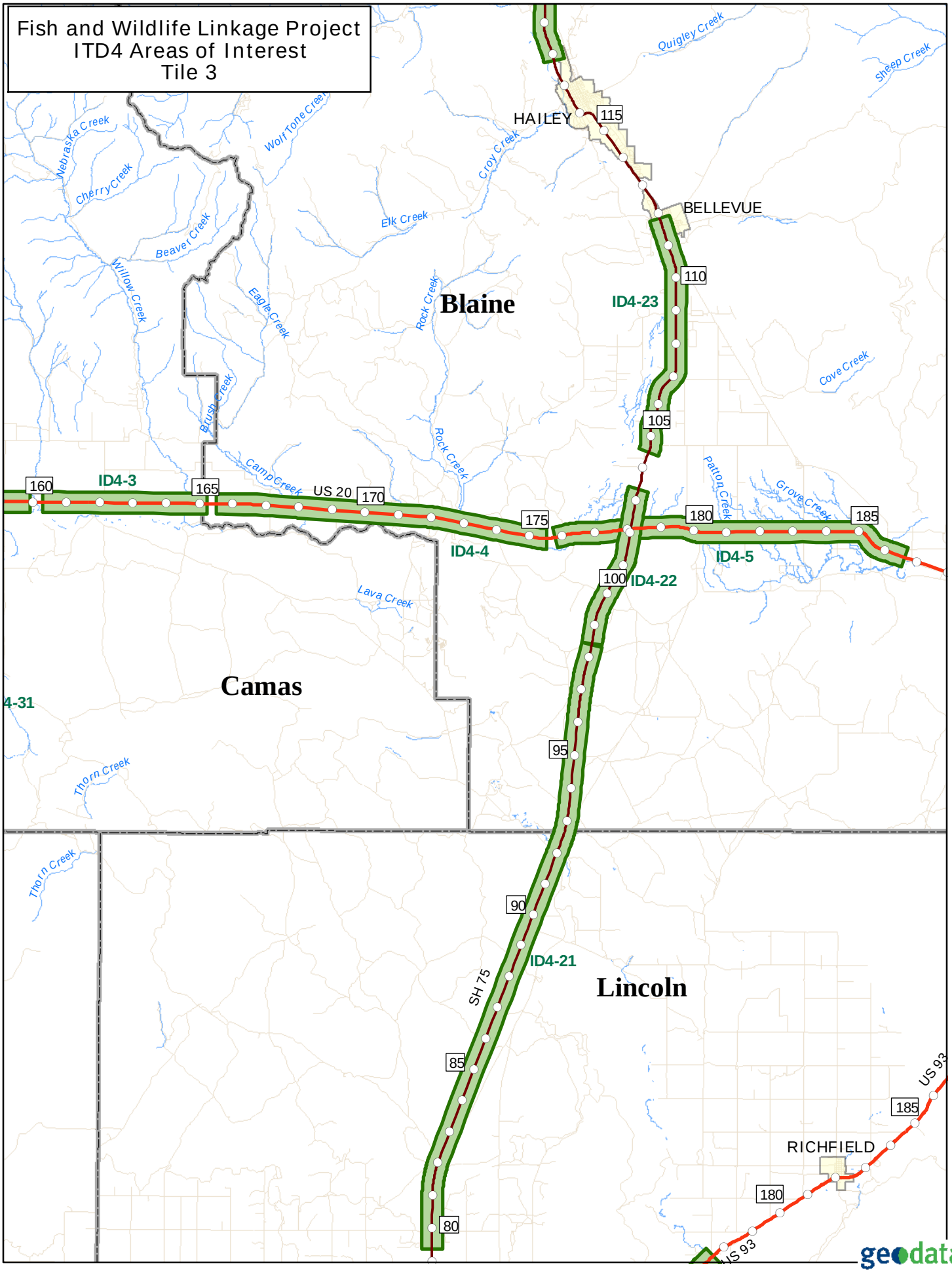

Fish and Wildlife Linkage Project
ITD3 Areas of Interest
Tile 12
Elmore
Owyhee
MOUNTAIN HOME
ID3-33
ID3-32
ID3-31
ID3-30
ID4-10
ID4-19
INT 84
SH 67
SH 78
Ditto Creek
Syrup Creek
Long Tom Creek
Canyon Creek
Dixie Creek
Bennett Creek
Dive Creek
Jacks Creek
75
80
85
90
95
100
105
110
115
5
0
15
10
70

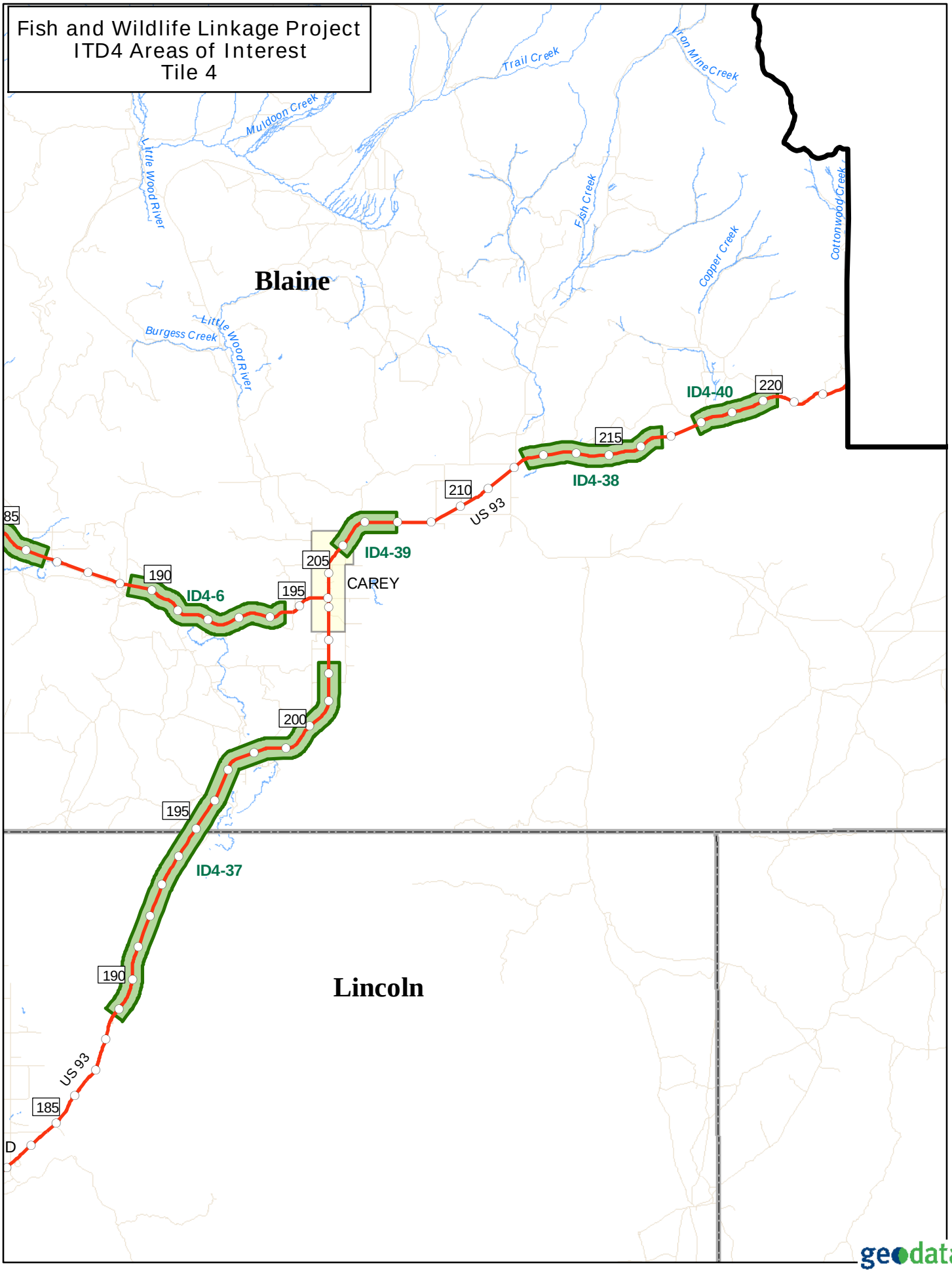

Fish and Wildlife Linkage Project
ITD3 Areas of Interest
Tile 13
115
120
125
130
135
ID4-9
ID4-8
ID4-7
ID4-1
US-20
Cat Creek
Little Camas Creek
Camas Creek
Dive Creek
East Fork Cold Springs Creek
King Hill Creek
Bennett Creek
West Fork King Hill Creek
Thorn Creek
Elmore
Alkali Creek
Cold Springs Creek
Dry Creek
Hog Creek
King Hill Creek
Alkali Creek
Little Canyon Creek
Clover Creek
0
115
120
125
130
GLENNS FERRY
ID4-18
ID4-17
geodata

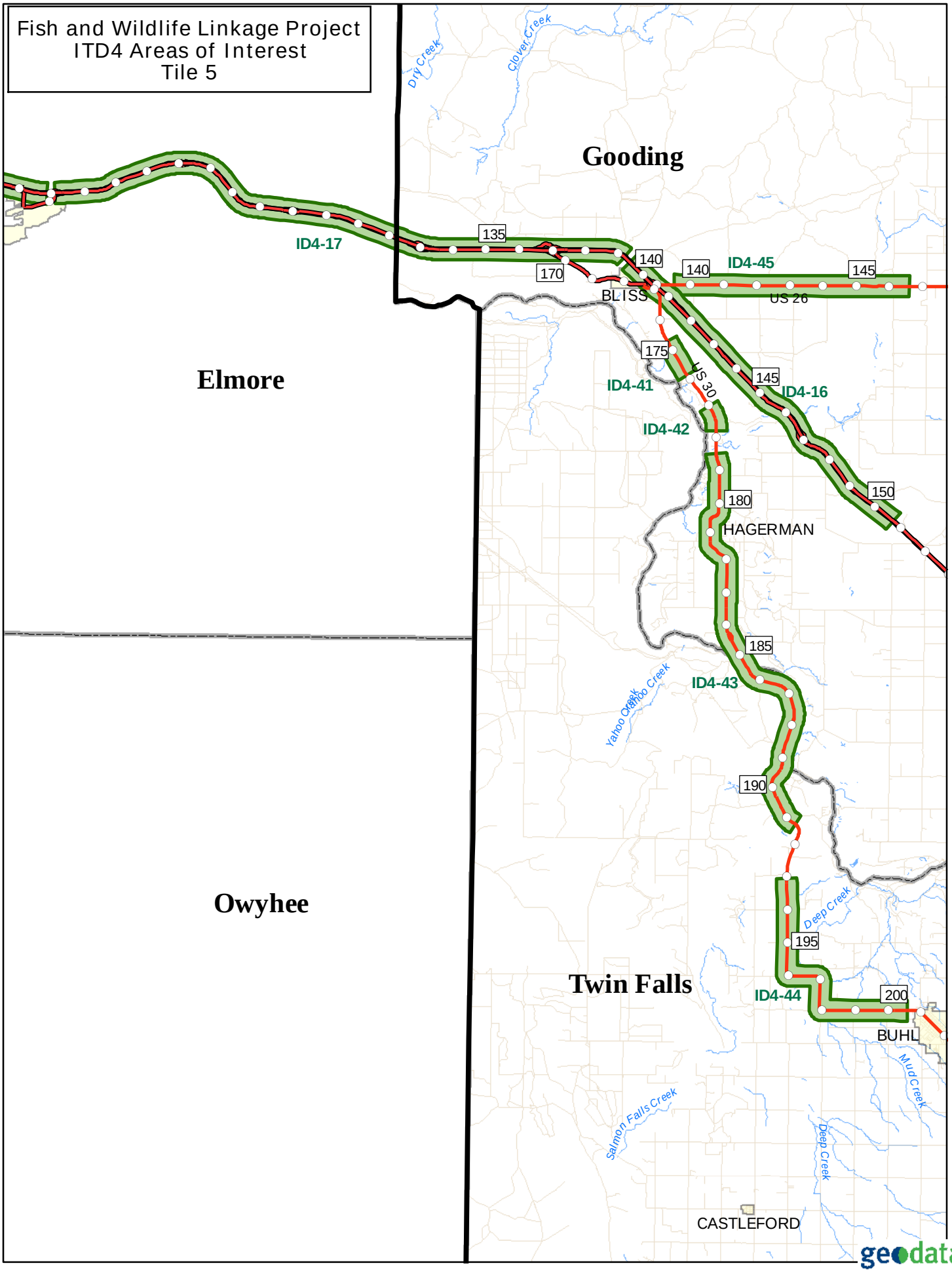

Fish and Wildlife Linkage Project
ITD4 Areas of Interest
Overview Map
1
2
3
4
5
6
7
8
9
10
11
Camas
Camas
Blaine
Gooding
Lincoln
Minidoka
Jerome
Twin Falls
Cassia
SUN VALLEY
HAILEY
FAIRFIELD
CAREY
RICHFIELD
SHOSHONE
JEROME
MINIDOKA
BUHL
TWIN FALLS
BURLEY
HOLLISTER
OAKLEY
ID4-11
geodata

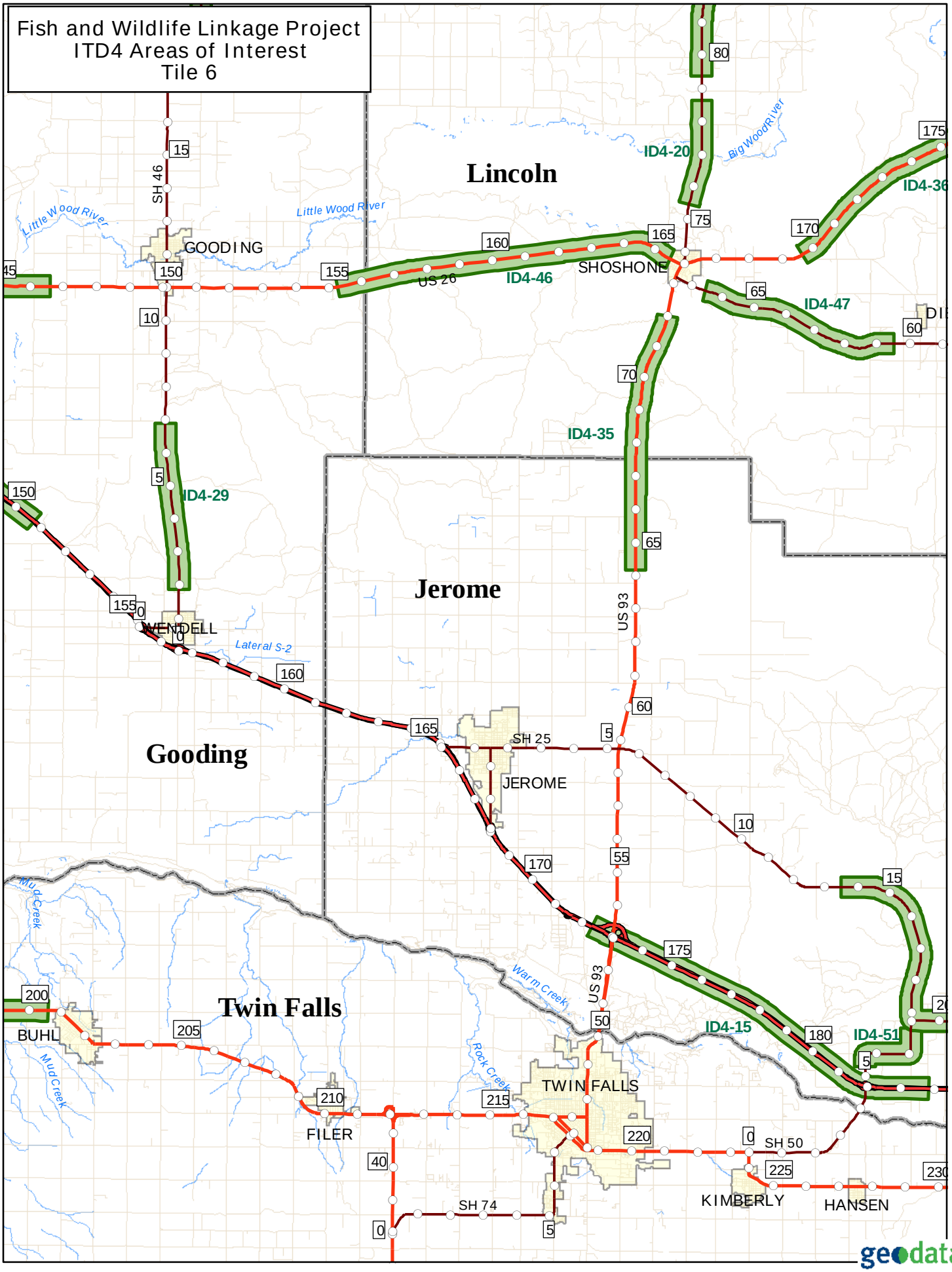

Fish and Wildlife Linkage Project
ITD4 Areas of Interest
Tile 1
170
165
160
155
150
145
140
135
130
125
120
ID4-27
ID4-28
ID4-26
ID4-25
ID4-24
Pole Creek
Senate Creek
Cherry Creek
Smiley Creek
Salmon River
Owl Creek
Prairie Creek
North Fork Big Wood River
Trail Creek
West Fork Trail Creek
Boulder Creek
Murdock Creek
Loggy Creek
West Fork Big Smoky Creek
Newman Creek
Fox Creek
Lake Creek
Baker Creek
Bluff Creek
Big Smoky Creek
Castle Creek
Rooks Creek
Warm Springs Creek
Camas
Blaine
KETCHUM
SUN VALLEY
Lick Creek
Spruce Creek
Cow Creek
East Fork Wood River
Carrie Creek
Enclosure Creek
Sullivan Creek
Little Smoky Creek
Pine Creek
Horn Creek
North Fork Deer Creek
Deer Creek
Willow Creek
geodata

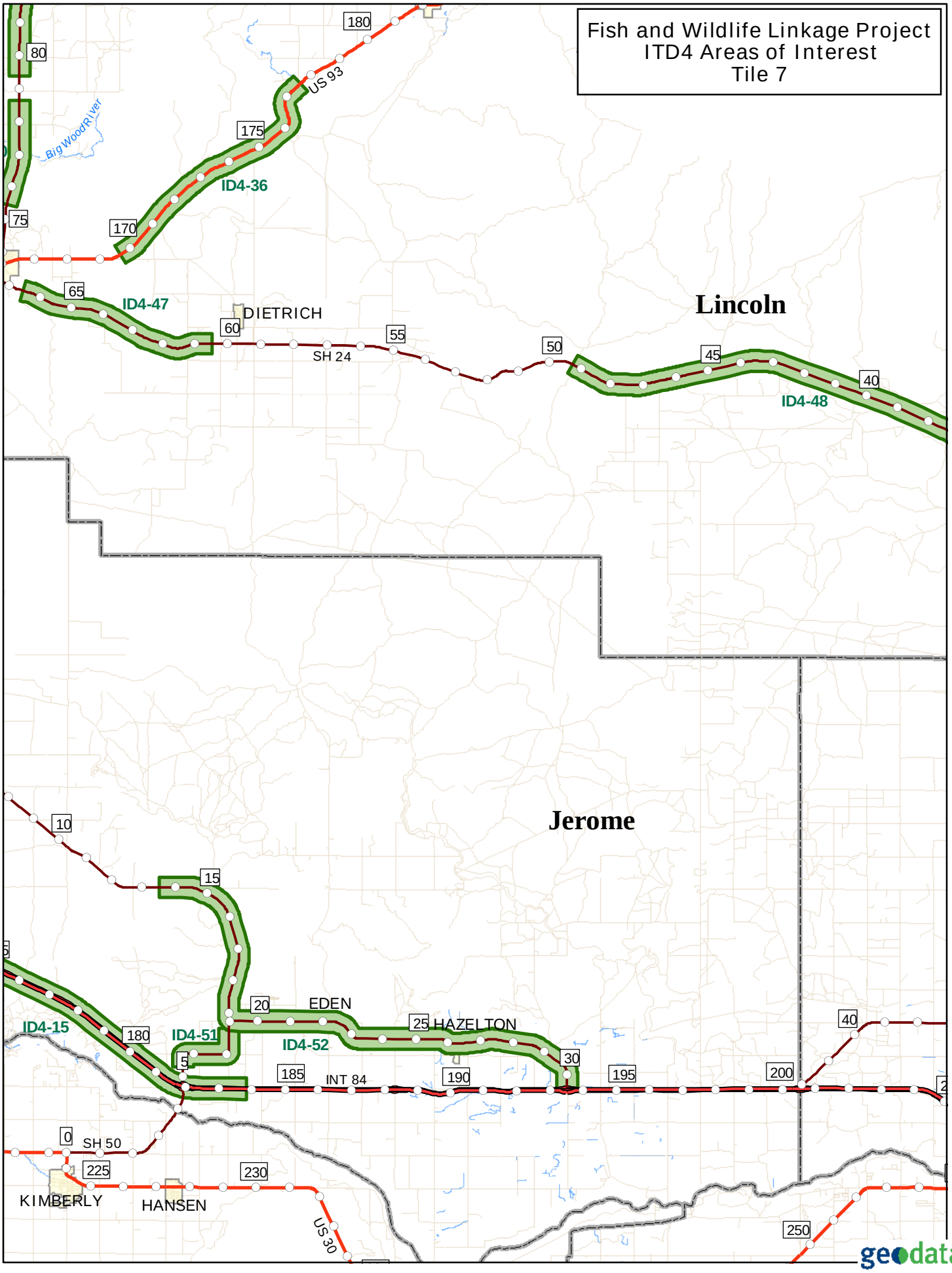

Fish and Wildlife Linkage Project
ITD4 Areas of Interest
Tile 2
Camas
Gooding
FAIRFIELD
US 20
SH 46
ID4-7
ID4-1
ID4-2
ID4-32
ID4-31
ID4-30
140
145
150
155
160
40
35
30
25
20
Stewart Creek
South Fork Lime Creek
East Fork Corral Creek
North Fork Soldier Creek
Salt Creek
Reedy Creek
Phillips Creek
Williams Creek
Sawmill Creek
Basalt Creek
Little Smoky Creek
Willow Creek
Elk Creek
Rough Creek
Corral Creek
Soldier Creek
Big Deer Creek
Fricke Creek
Chimney Creek
Deer Creek
Threemile Creek
Spring Creek
Dairy Creek
McKinney Creek
Thorn Creek
Clover Creek
Calf Creek
Dry Creek
geodata

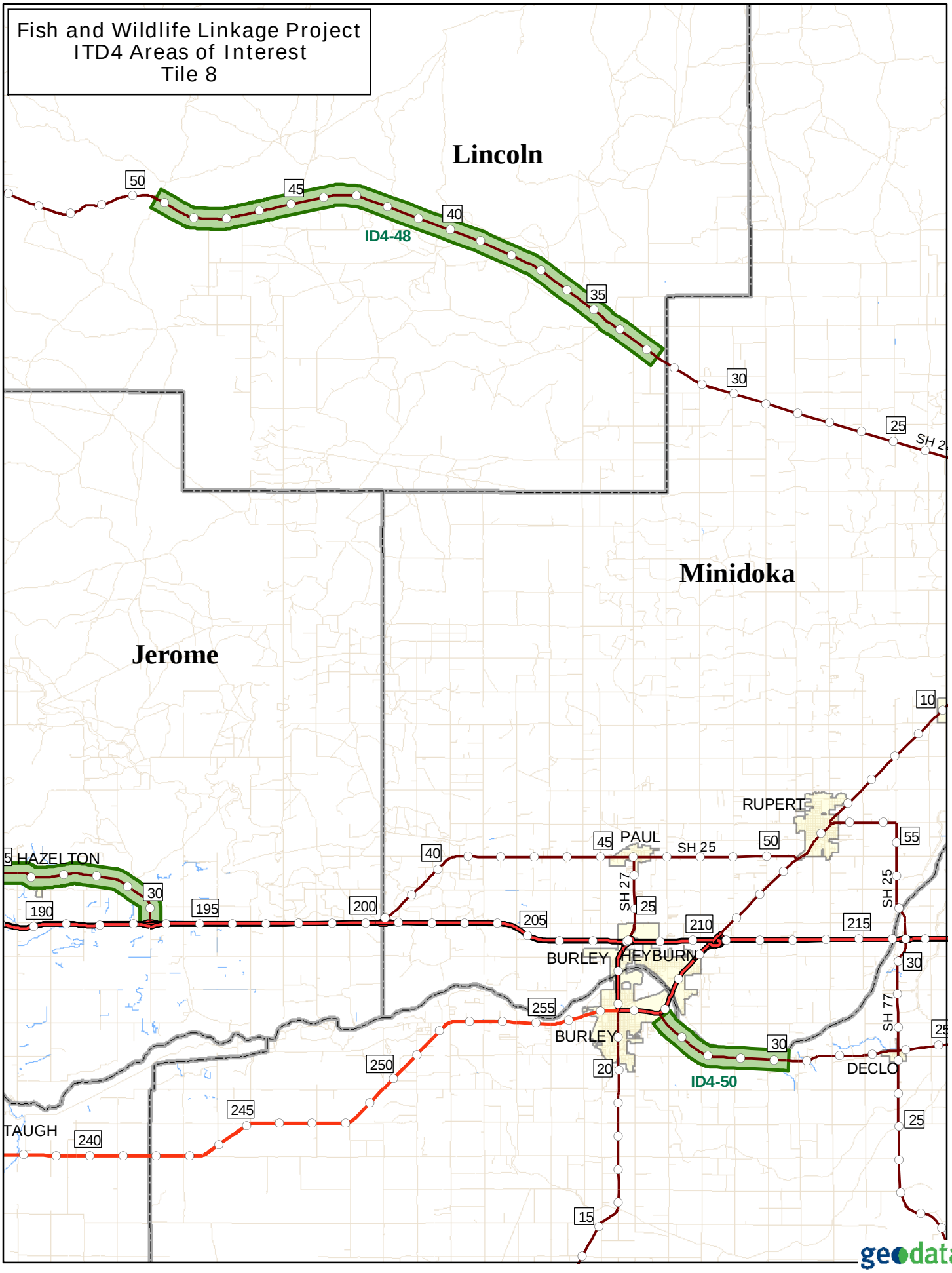

Fish and Wildlife Linkage Project
ITD4 Areas of Interest
Tile 3
HAILEY
BELLEVUE
Blaine
Camas
Lincoln
RICHFIELD
ID4-3
ID4-4
ID4-5
ID4-21
ID4-22
ID4-23
US 20
SH 75
US 93
Quigley Creek
Sheep Creek
Nebraska Creek
Cherry Creek
Wolf Tone Creek
Croy Creek
Elk Creek
Beaver Creek
Willow Creek
Eagle Creek
Rock Creek
Brush Creek
Camp Creek
Cove Creek
Patton Creek
Grove Creek
Lava Creek
Thorn Creek
115
110
105
100
95
90
85
80
160
165
170
175
180
185
geodata

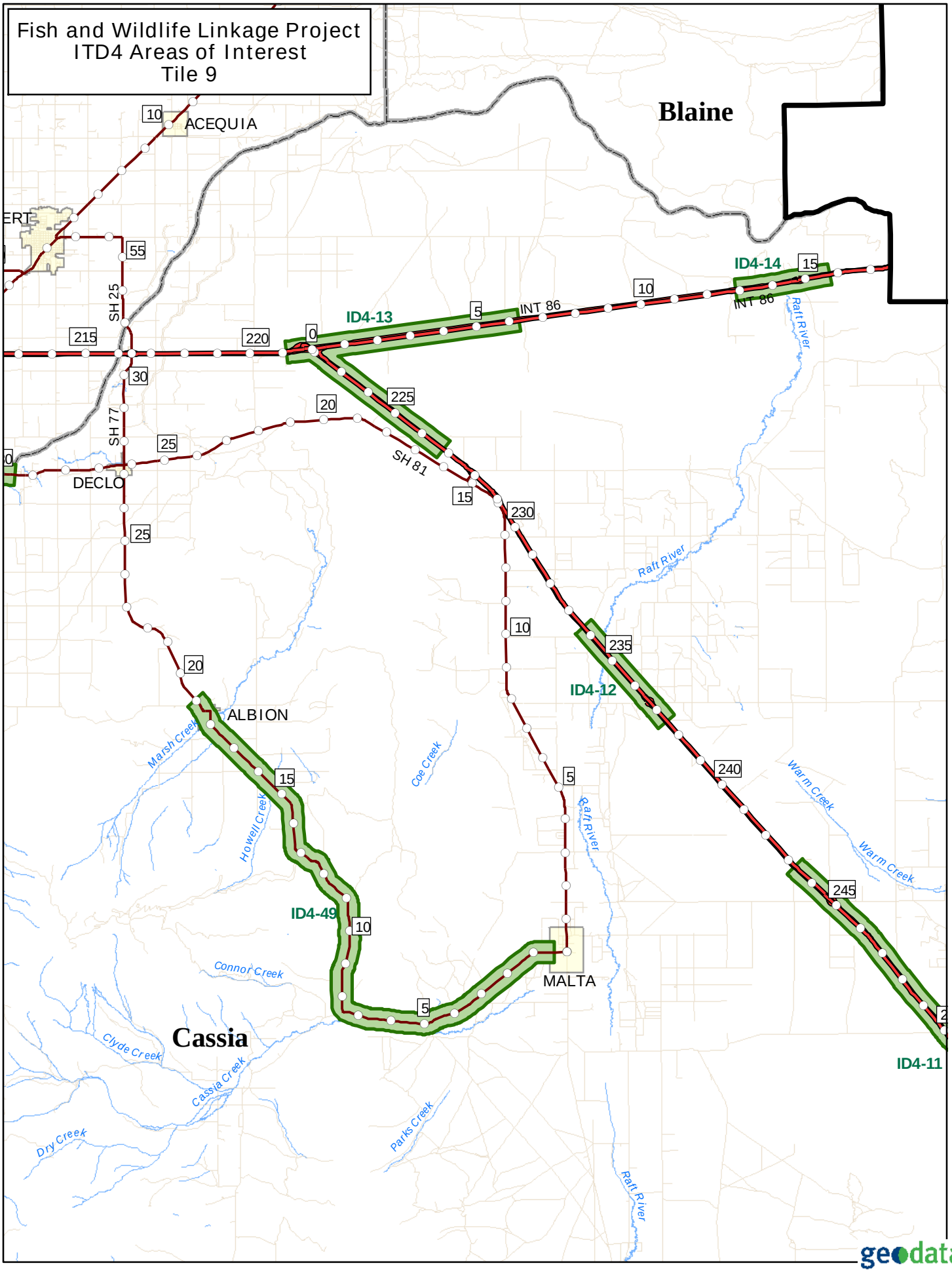

Fish and Wildlife Linkage Project
ITD4 Areas of Interest
Tile 4
Trail Creek
Iron Mine Creek
Muldoon Creek
Little Wood River
Fish Creek
Copper Creek
Cottonwood Creek
Blaine
Burgess Creek
Little Wood River
ID4-40
220
215
ID4-38
210
US 93
ID4-39
205
CAREY
190
ID4-6
195
200
195
ID4-37
190
Lincoln
US 93
185
D
geodata

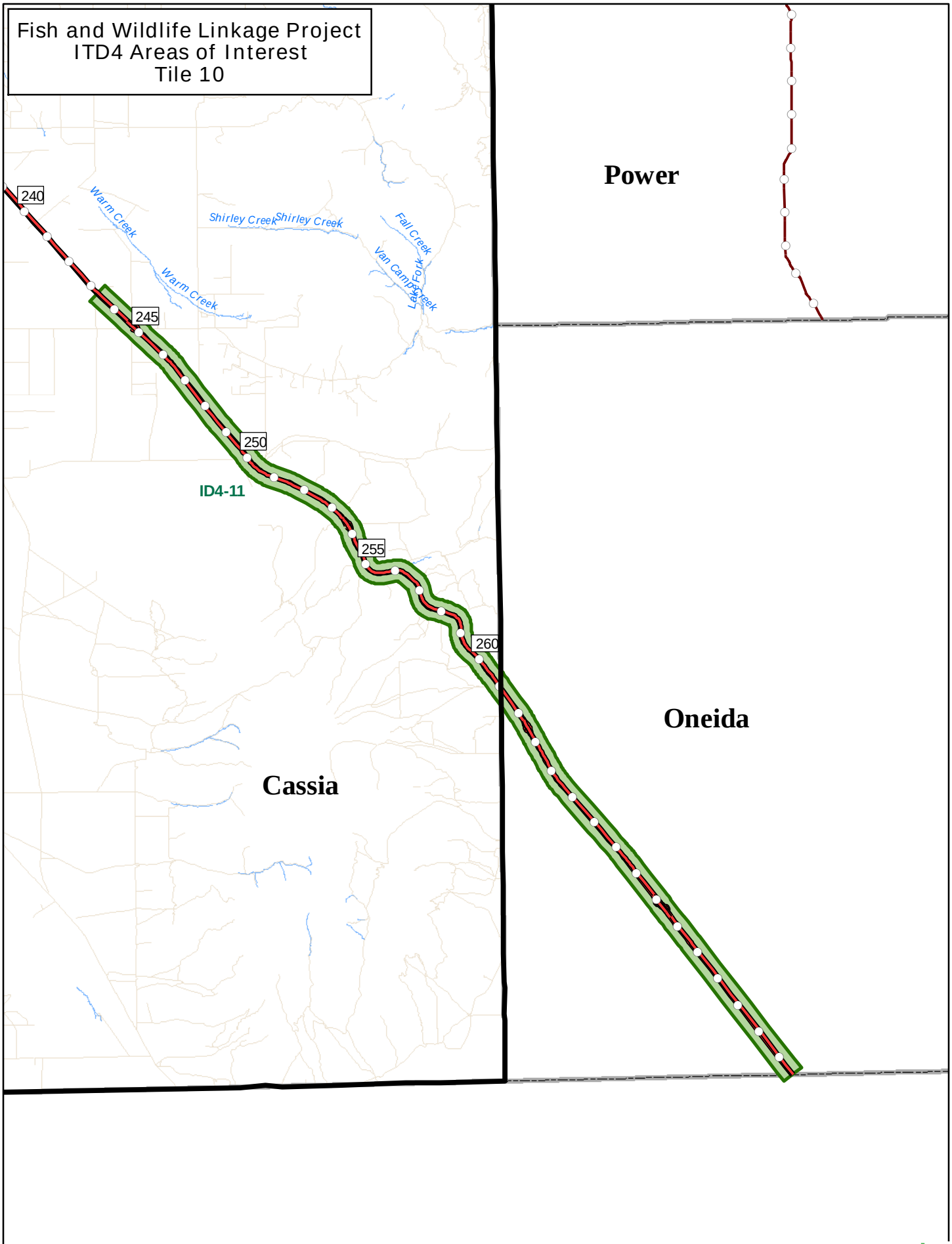

Fish and Wildlife Linkage Project
ITD4 Areas of Interest
Tile 5
Gooding
Elmore
Owyhee
Twin Falls
ID4-17
ID4-45
ID4-41
ID4-42
ID4-16
ID4-43
ID4-44
135
140
170
140
145
175
145
150
180
185
190
195
200
BLISS
US 26
US 30
HAGERMAN
BUHL
CASTLEFORD
Dry Creek
Clover Creek
Yahoo Creek
Deep Creek
Mud Creek
Salmon Falls Creek
Deep Creek
geodata


Fish and Wildlife Linkage Project
ITD4 Areas of Interest
Tile 6
Lincoln
Jerome
Gooding
Twin Falls
GOODING
SHOSHONE
WENDELL
JEROME
BUHL
FILER
TWIN FALLS
KIMBERLY
HANSEN
ID4-20
ID4-36
ID4-46
ID4-47
ID4-35
ID4-29
ID4-15
ID4-51
SH 46
US 26
US 93
SH 25
SH 50
SH 74
Little Wood River
Big Wood River
Lateral S-2
Mud Creek
Warm Creek
Rock Creek
geodata

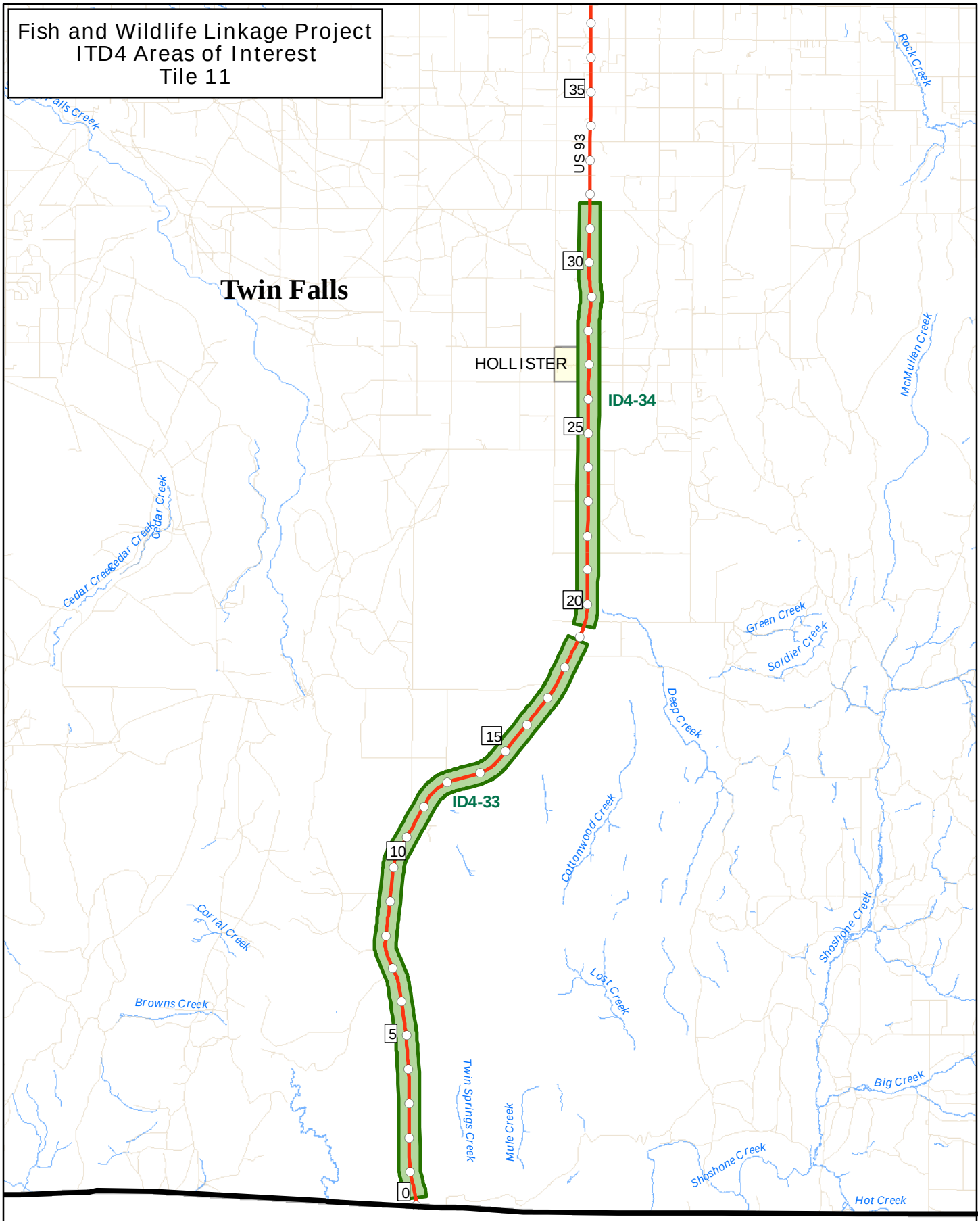

Fish and Wildlife Linkage Project
ITD4 Areas of Interest
Tile 7
Lincoln
Jerome
ID4-36
ID4-47
ID4-48
ID4-15
ID4-51
ID4-52
DIETRICH
SH 24
US 93
Big Wood River
EDEN
HAZELTON
INT 84
SH 50
KIMBERLY
HANSEN
US 30
80
75
180
175
170
65
60
55
50
45
40
10
15
20
25
30
5
0
185
190
195
200
225
230
250


Fish and Wildlife Linkage Project
ITD4 Areas of Interest
Tile 8
Lincoln
Minidoka
Jerome
ID4-48
ID4-50
HAZELTON
PAUL
RUPERT
BURLEY
HEYBURN
DECLO
TAUGH
SH 25
SH 27
SH 77
SH 2
50
45
40
35
30
25
10
55
20
15
190
195
200
205
210
215
240
245
250
255


Fish and Wildlife Linkage Project
ITD4 Areas of Interest
Tile 9
Blaine
Cassia
ACEQUIA
DECLO
ALBION
MALTA
ID4-11
ID4-12
ID4-13
ID4-14
ID4-49
INT 86
SH 25
SH 77
SH 81
Raft River
Marsh Creek
Howell Creek
Coe Creek
Warm Creek
Connor Creek
Clyde Creek
Cassia Creek
Dry Creek
Parks Creek
geodata


Fish and Wildlife Linkage Project
ITD4 Areas of Interest
Tile 10
Power
Oneida
Cassia
240
245
250
255
260
ID4-11
Warm Creek
Warm Creek
Shirley Creek
Shirley Creek
Fall Creek
Van Camp Creek
Left Fork

geodata


Fish and Wildlife Linkage Project
ITD4 Areas of Interest
Tile 11
Twin Falls
HOLLISTER
US 93
ID4-34
ID4-33
35
30
25
20
15
10
5
0
Rock Creek
McMullen Creek
Green Creek
Soldier Creek
Deep Creek
Cottonwood Creek
Lost Creek
Shoshone Creek
Big Creek
Hot Creek
Twin Springs Creek
Mule Creek
Corral Creek
Browns Creek
Cedar Creek
Cedar Creek
Cedar Creek

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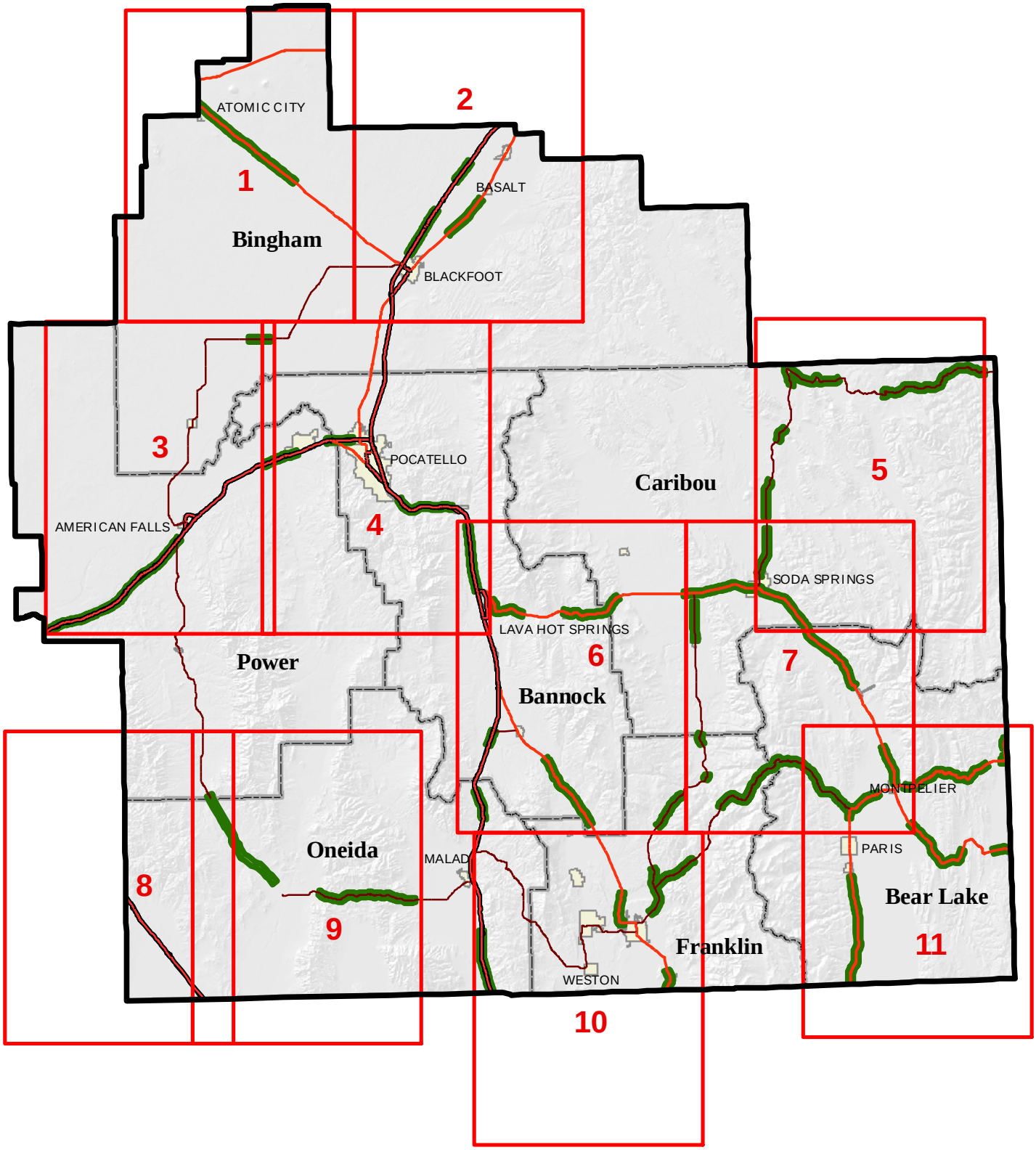
Fish and Wildlife Linkage Project
ITD5 Areas of Interest
Overview Map



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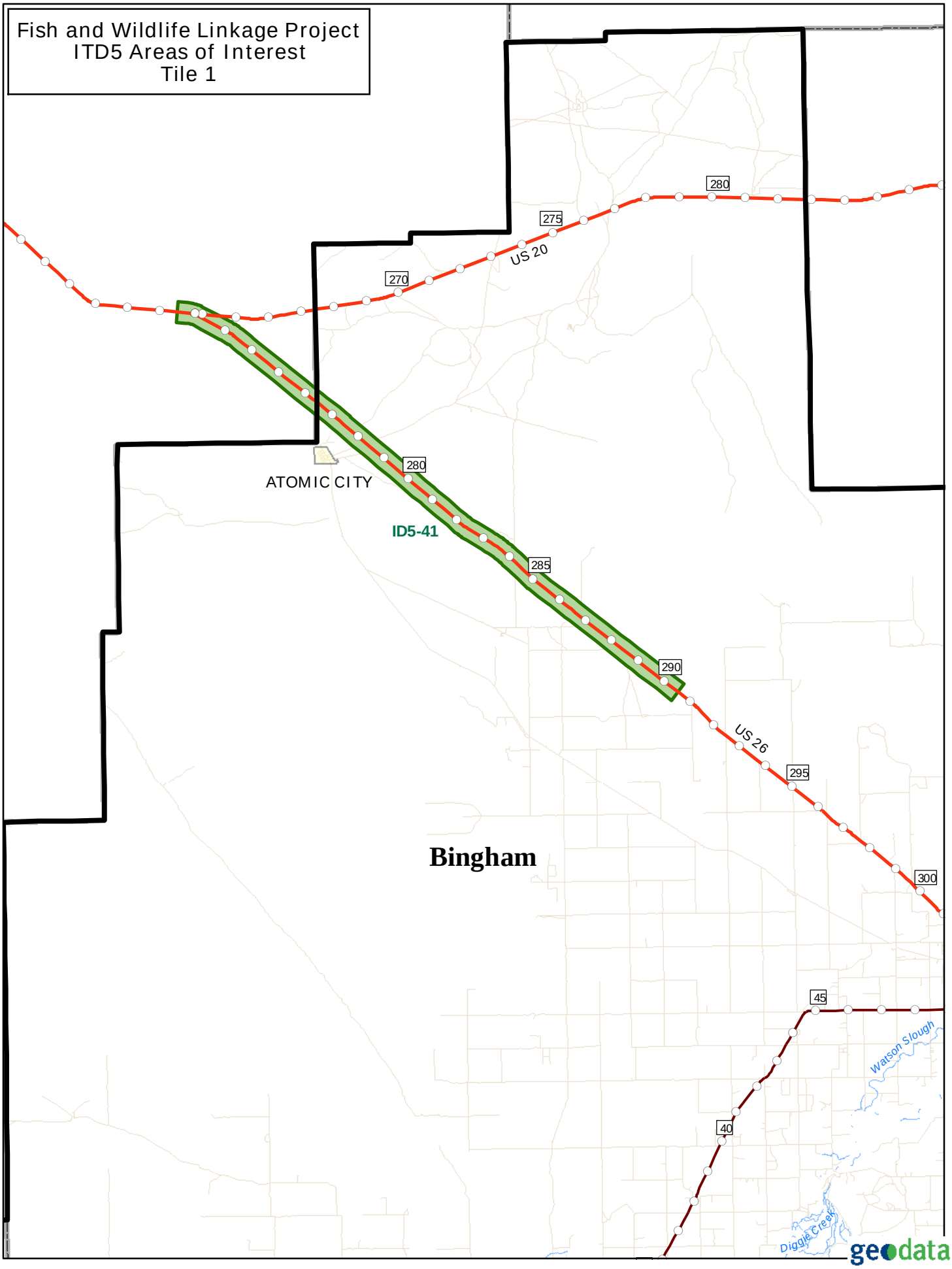
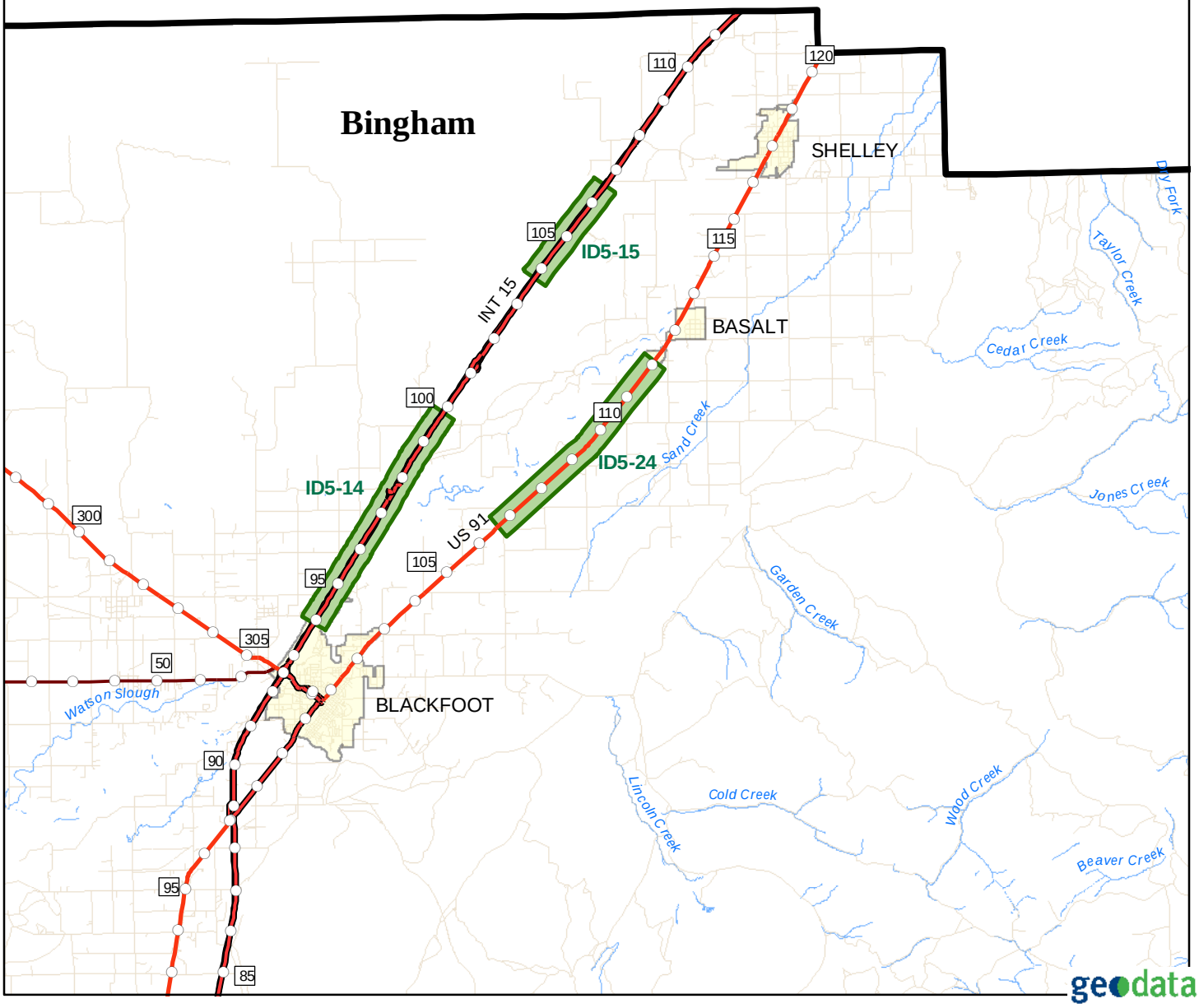

Fish and Wildlife Linkage Project
ITD5 Areas of Interest
Tile 1
280
275
US 20
270
280
ATOMIC CITY
ID5-41
285
290
US 26
295
Bingham
300
45
Watson Slough
40
Diggle Creek
geodata

Fish and Wildlife Linkage Project
ITD5 Areas of Interest
Tile 2



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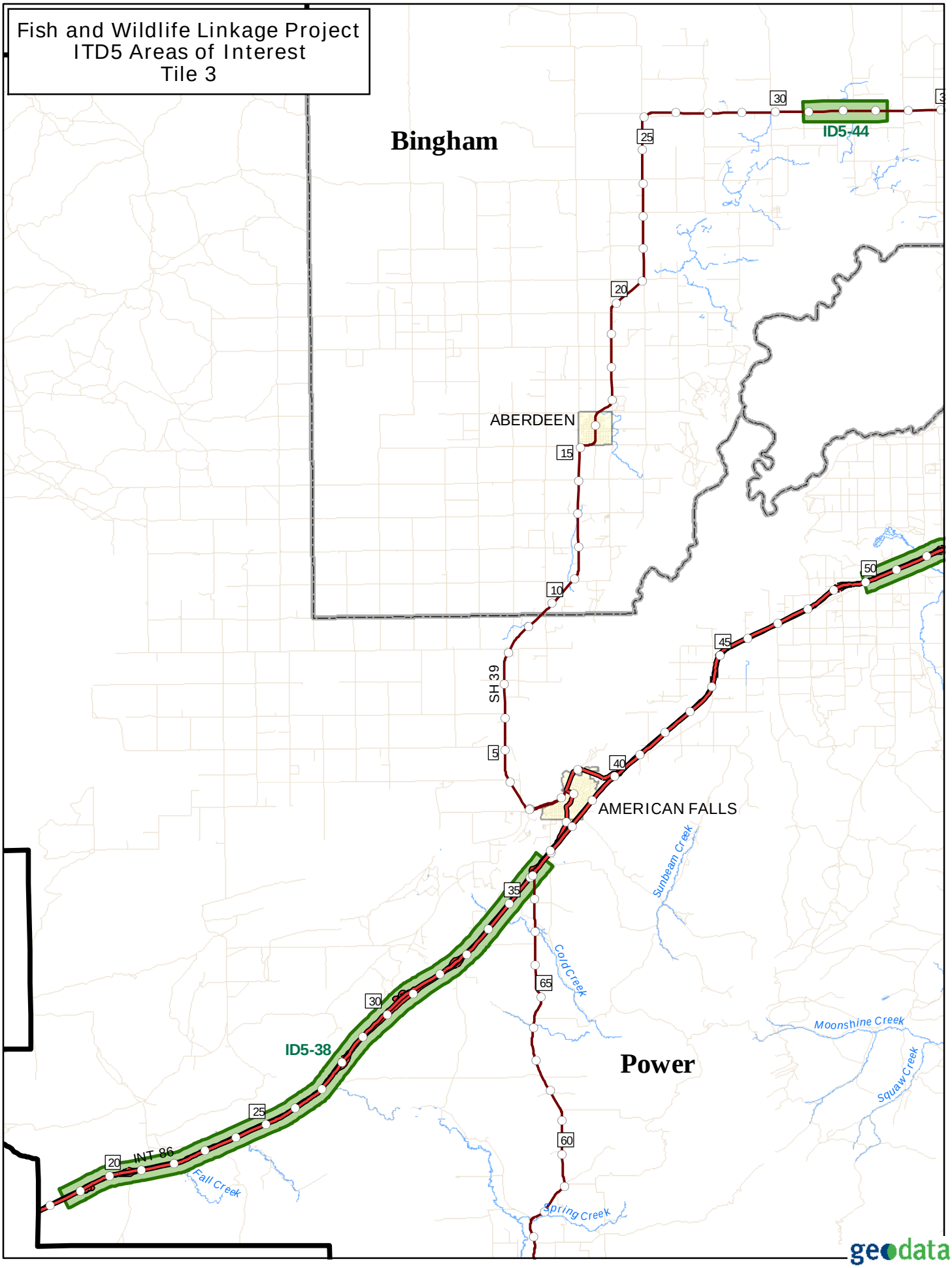
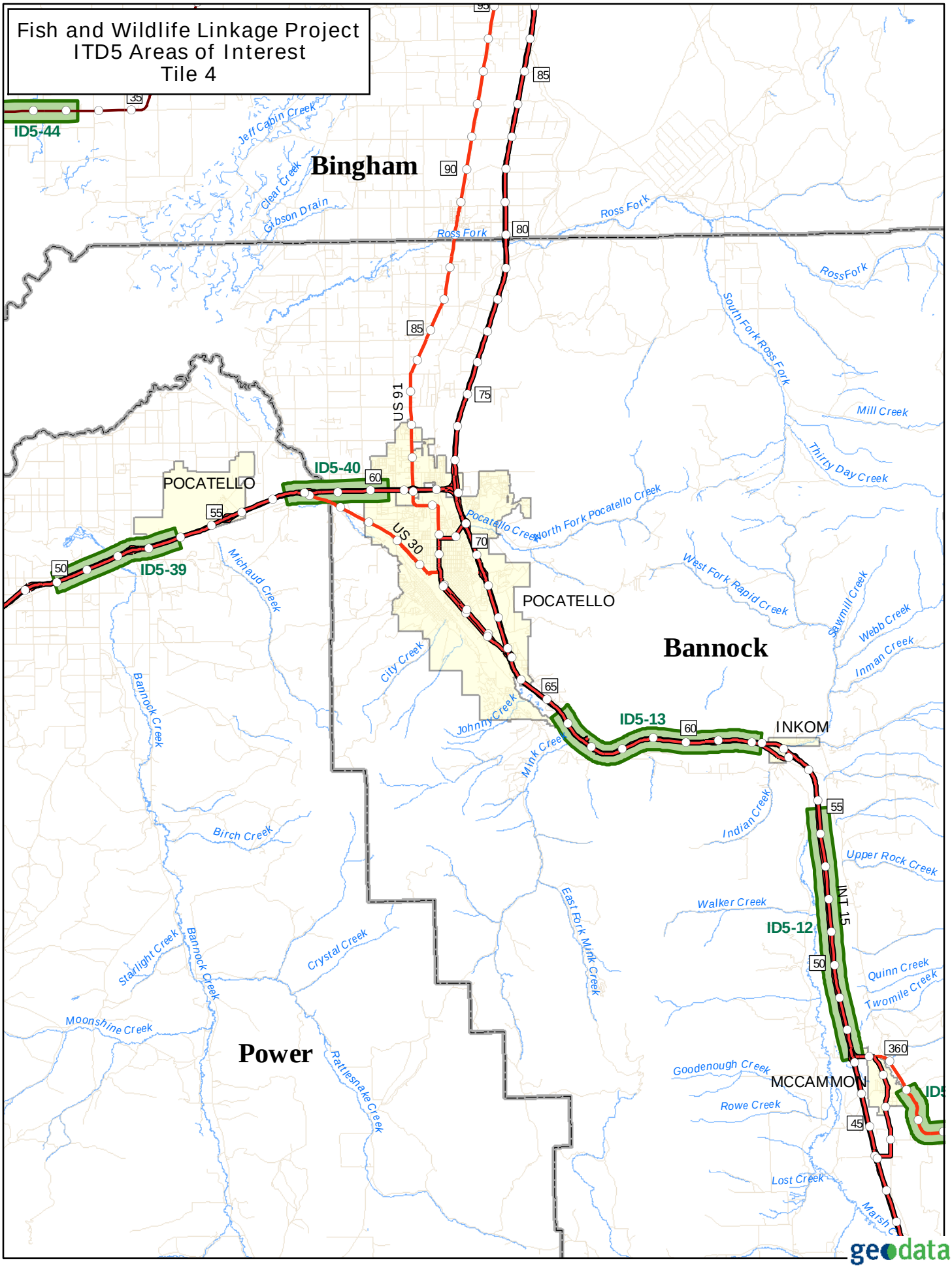
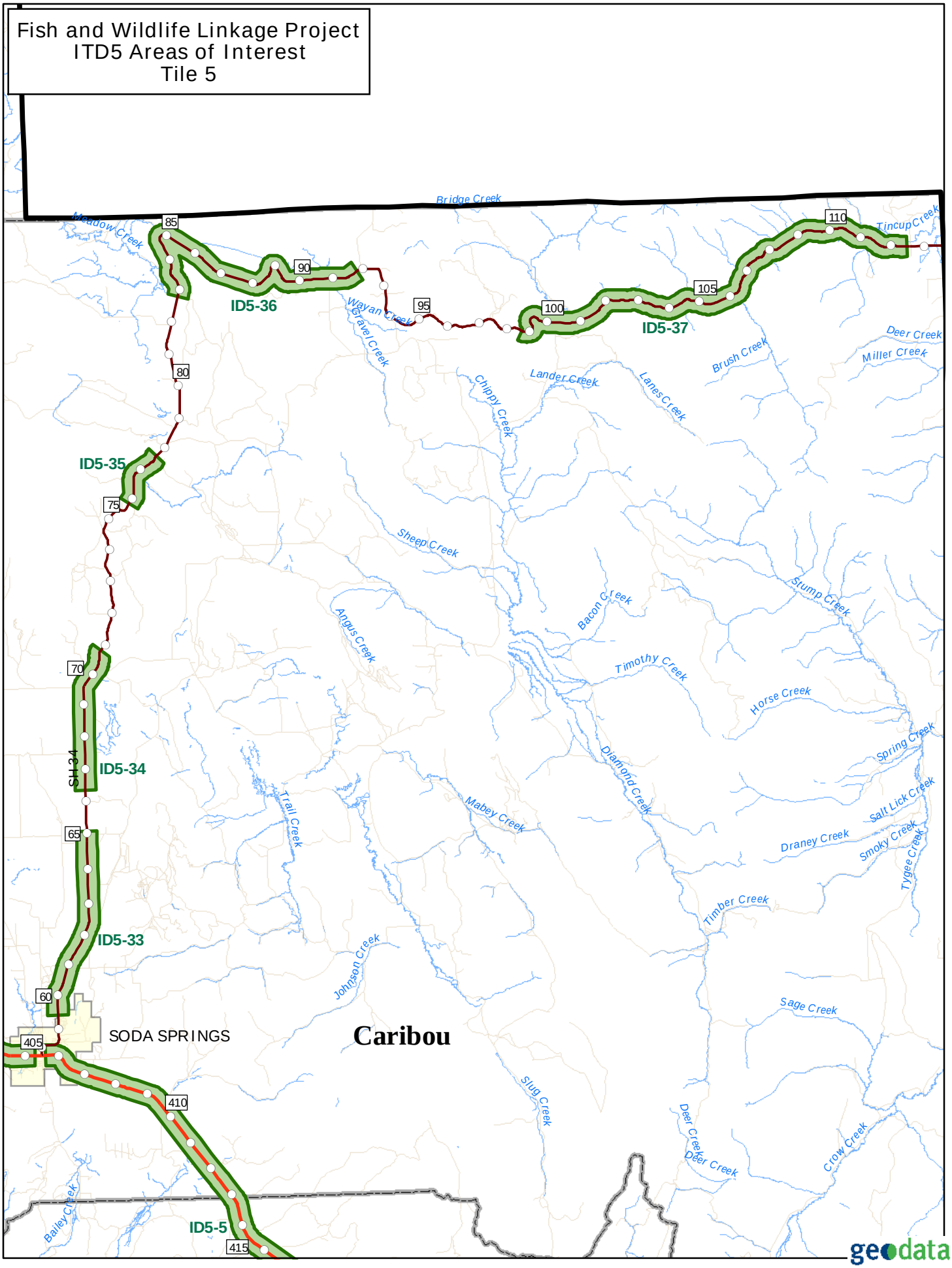
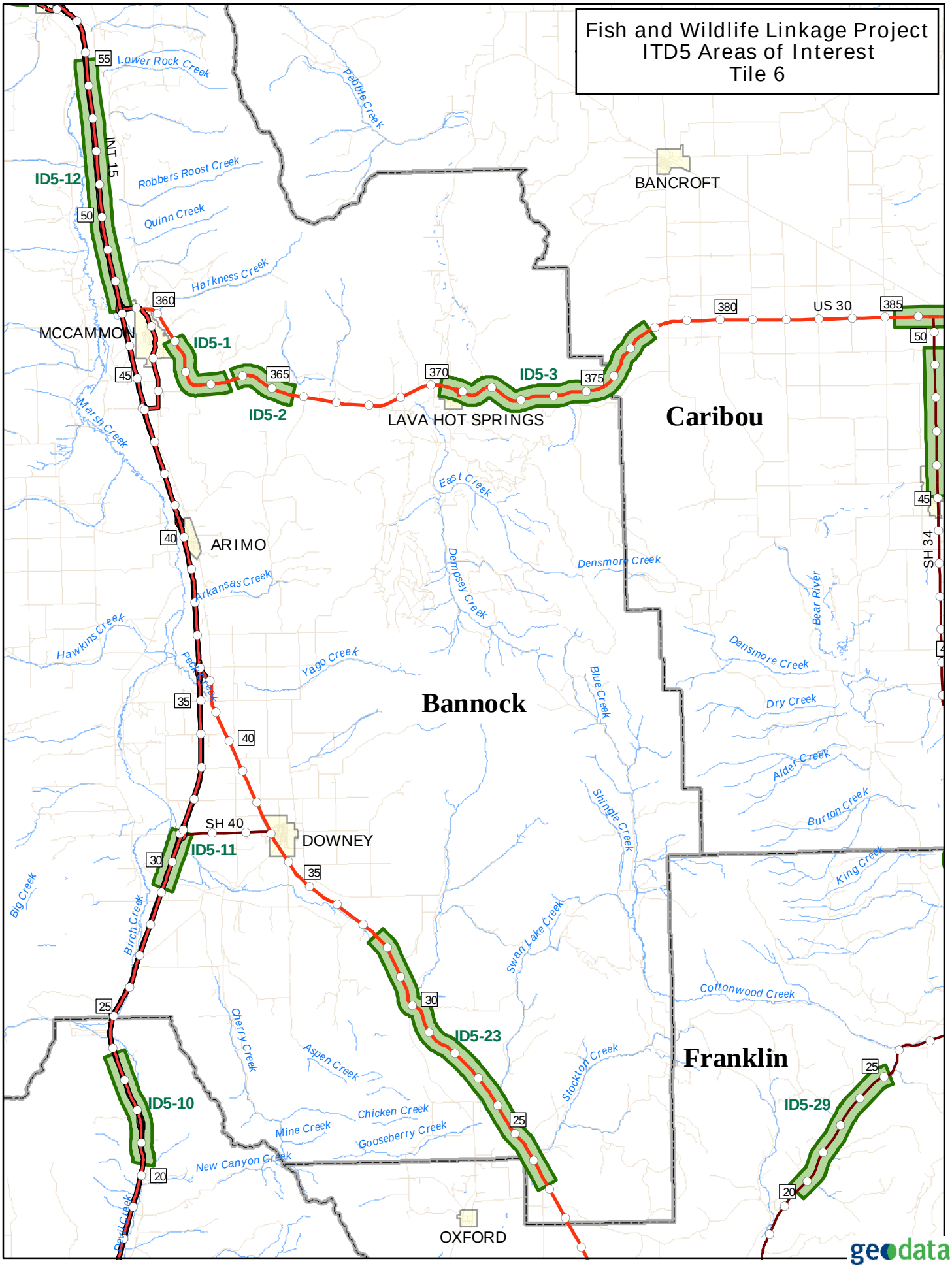
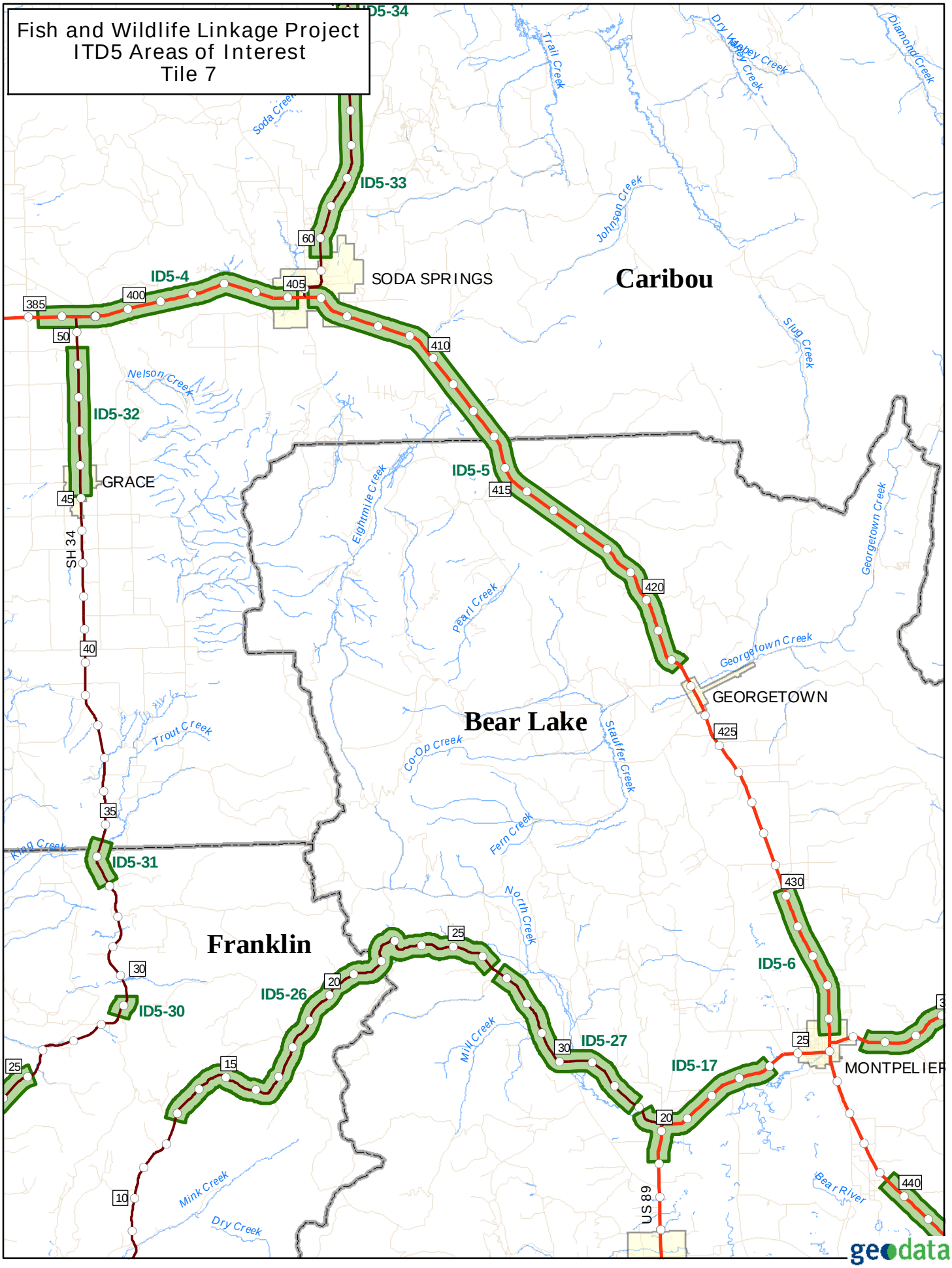

Fish and Wildlife Linkage Project
ITD5 Areas of Interest
Tile 3
Bingham
ID5-44
ABERDEEN
SH 39
AMERICAN FALLS
Power
ID5-38
INT 86
Sunbeam Creek
Cold Creek
Moonshine Creek
Squaw Creek
Fall Creek
Spring Creek
geodata


Fish and Wildlife Linkage Project
ITD5 Areas of Interest
Tile 4
ID5-44
Bingham
Jeff Cabin Creek
Clear Creek
Gibson Drain
Ross Fork
RossFork
South Fork Ross Fork
Mill Creek
Thirty Day Creek
US 91
ID5-40
POCATELLO
US 30
Pocatello Creek
North Fork Pocatello Creek
ID5-39
Michaud Creek
West Fork Rapid Creek
Sawmill Creek
Webb Creek
Inman Creek
Bannock
City Creek
Bannock Creek
Johnny Creek
Mink Creek
ID5-13
INKOM
Indian Creek
Upper Rock Creek
Birch Creek
East Fork Mink Creek
Walker Creek
INT 15
ID5-12
Starlight Creek
Crystal Creek
Quinn Creek
Twomile Creek
Moonshine Creek
Power
Rattlesnake Creek
Goodenough Creek
MCCAMMON
Rowe Creek
Lost Creek
geodata

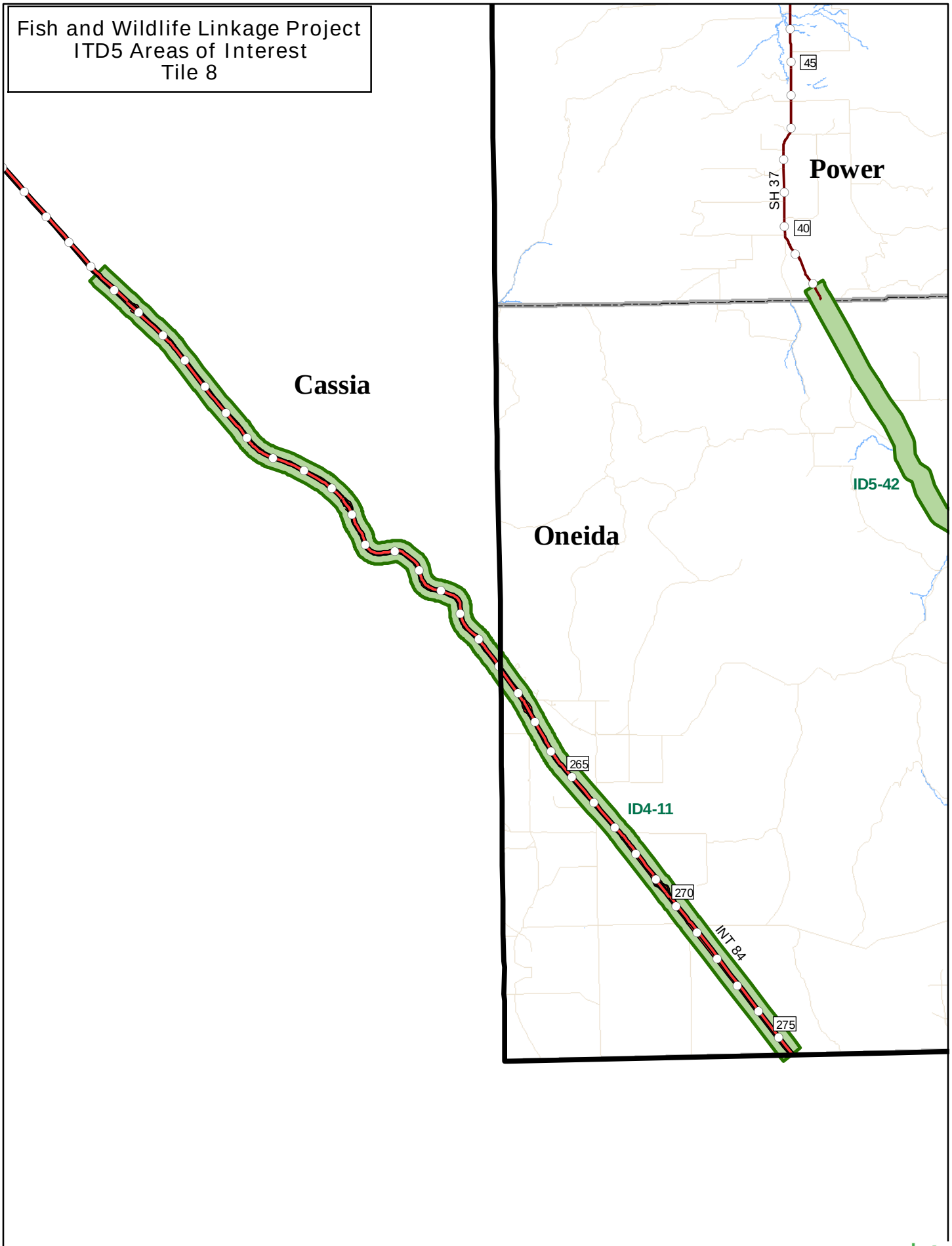
Fish and Wildlife Linkage Project
ITD5 Areas of Interest
Tile 5




Fish and Wildlife Linkage Project
ITD5 Areas of Interest
Tile 6
ID5-12
ID5-1
ID5-2
ID5-3
ID5-11
ID5-10
ID5-23
ID5-29
INT 15
US 30
SH 34
SH 40
MCCAMMON
ARIMO
DOWNEY
LAVA HOT SPRINGS
BANCROFT
OXFORD
Caribou
Bannock
Franklin
Lower Rock Creek
Robbers Roost Creek
Quinn Creek
Harkness Creek
Pebble Creek
Marsh Creek
Arkansas Creek
Hawkins Creek
Pack Creek
Yago Creek
East Creek
Dempsey Creek
Densmore Creek
Bear River
Dry Creek
Alder Creek
Burton Creek
Blue Creek
Shingle Creek
King Creek
Big Creek
Birch Creek
Swan Lake Creek
Cottonwood Creek
Cherry Creek
Aspen Creek
Stockton Creek
Chicken Creek
Mine Creek
Gooseberry Creek
New Canyon Creek
Bear Creek
55
50
360
45
365
370
375
380
385
40
35
30
25
20
geodata


Fish and Wildlife Linkage Project
ITD5 Areas of Interest
Tile 7
ID5-34
ID5-33
ID5-4
ID5-32
ID5-5
ID5-31
ID5-30
ID5-26
ID5-27
ID5-6
ID5-17
SODA SPRINGS
GRACE
GEORGETOWN
MONTPELIER
Caribou
Bear Lake
Franklin
SH 34
US 89
Soda Creek
Trail Creek
Dry Valley Creek
Diamond Creek
Johnson Creek
Slug Creek
Nelson Creek
Eightmile Creek
Georgetown Creek
Pearl Creek
Trout Creek
Co-Op Creek
Stauffer Creek
Fern Creek
North Creek
Mill Creek
Mink Creek
Dry Creek
Bear River
60
405
385
400
50
410
45
415
420
40
425
35
430
30
25
20
15
10
440

Fish and Wildlife Linkage Project
ITD5 Areas of Interest
Tile 8



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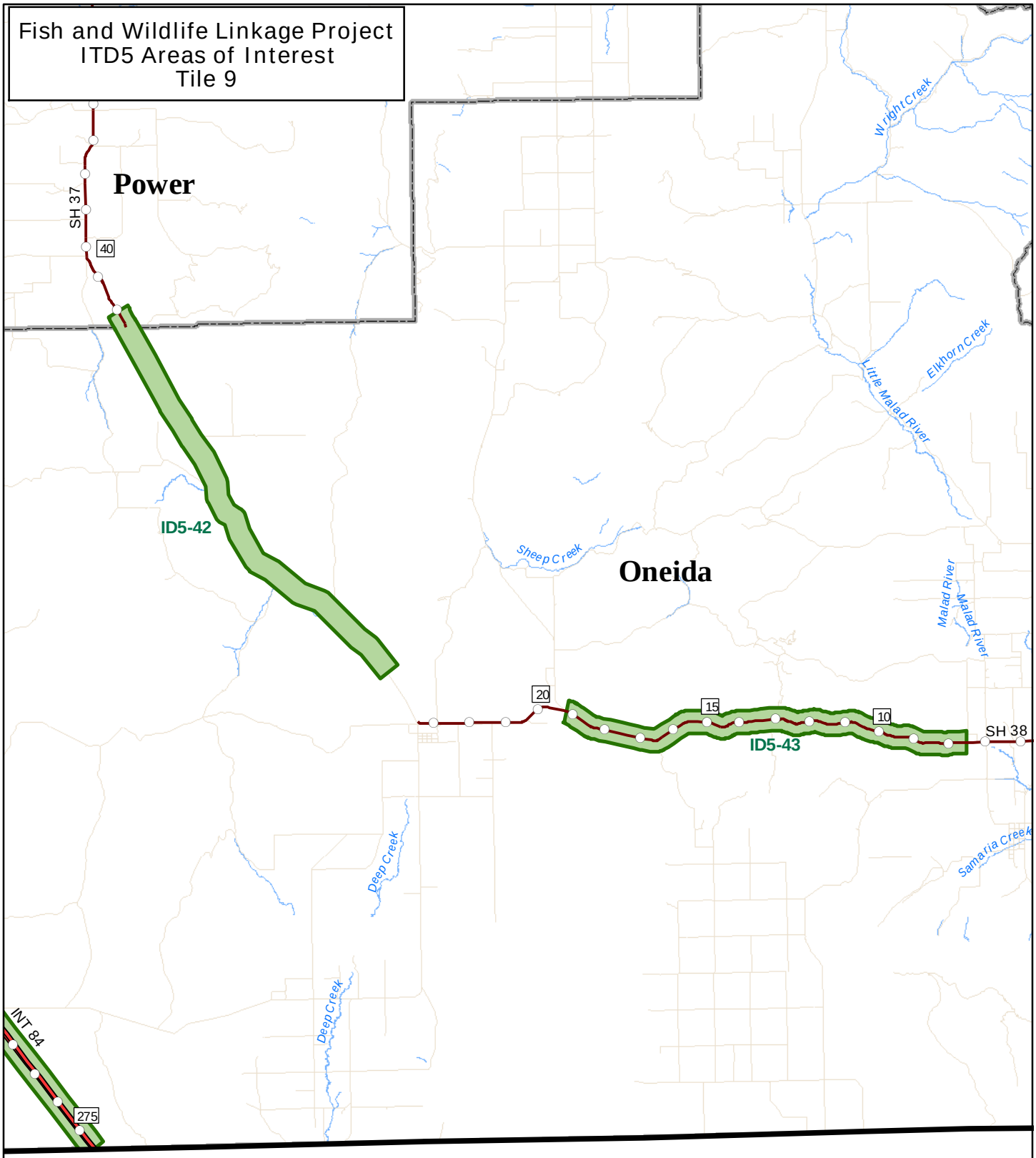
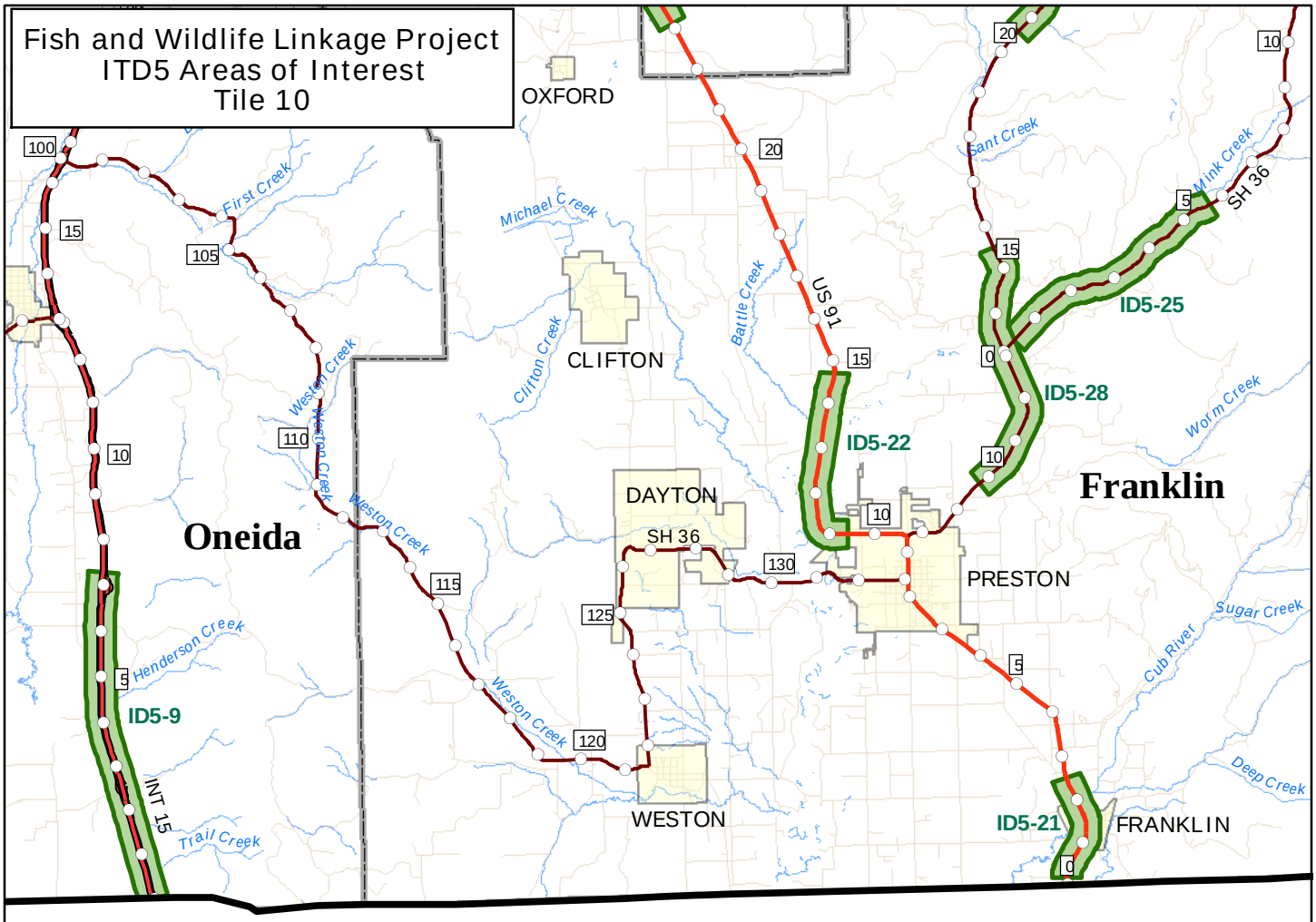
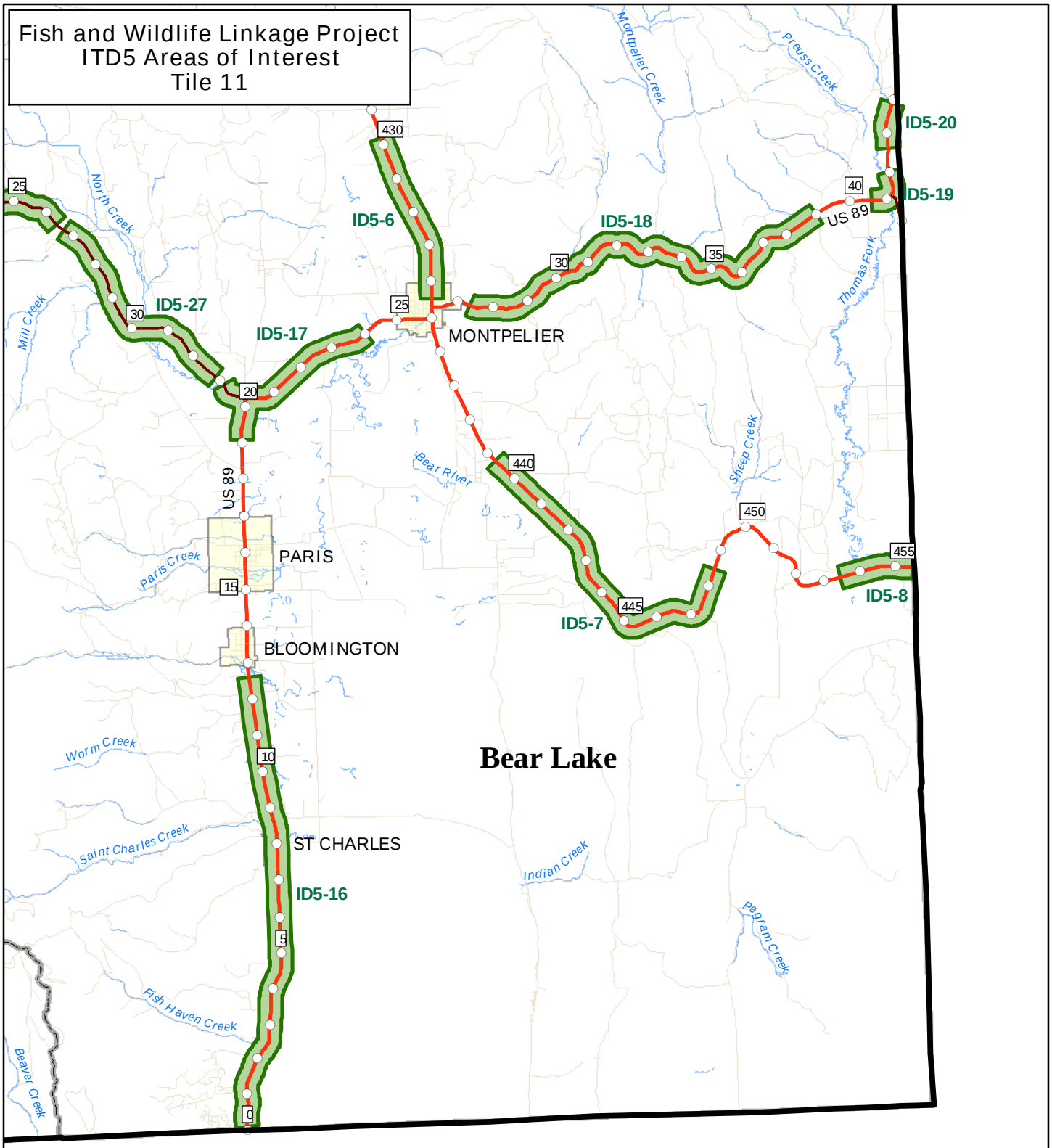

Fish and Wildlife Linkage Project
ITD5 Areas of Interest
Tile 9
Power
SH 37
40
ID5-42
Sheep Creek
Oneida
Wright Creek
Elkhorn Creek
Little Malad River
Malad River
Malad River
20
15
10
SH 38
ID5-43
Samaria Creek
Deep Creek
Deep Creek
INT 84
275

geodata


Fish and Wildlife Linkage Project
ITD5 Areas of Interest
Tile 10
OXFORD
CLIFTON
DAYTON
PRESTON
WESTON
FRANKLIN
Oneida
Franklin
ID5-9
ID5-21
ID5-22
ID5-25
ID5-28
US 91
SH 36
INT 15
First Creek
Michael Creek
Clifton Creek
Battle Creek
Sant Creek
Mink Creek
Worm Creek
Weston Creek
Henderson Creek
Trail Creek
Sugar Creek
Cub River
Deep Creek

geodata


Fish and Wildlife Linkage Project
ITD5 Areas of Interest
Tile 11
ID5-20
ID5-19
ID5-18
ID5-6
ID5-27
ID5-17
ID5-7
ID5-8
ID5-16
US 89
MONTPELIER
PARIS
BLOOMINGTON
ST CHARLES
Bear Lake
Montpelier Creek
Preuss Creek
North Creek
Mill Creek
Thomas Fork
Bear River
Sheep Creek
Paris Creek
Worm Creek
Saint Charles Creek
Indian Creek
Pegram Creek
Fish Haven Creek
Beaver Creek
25
30
20
15
10
5
0
430
440
445
450
455
35
40

geodata

Appendix B – Detailed Comments on Wildlife Linkage Areas

ITD_ID	AOI_NAME	PRIORITY	SPECIES	MIG_POP	LOC_POP	SCALE	HWY_MORT
ID3-1	Micron	Low	mule deer/antelope/badger	Yes, mule deer	Yes (pronghorn)	Local/Regional	
ID3-2	Boise River WMA 1	High	mule deer/elk/antelope/mountain lion/mid-sized carnivore species/golden eagles, raptors, bald eagles, quail	Yes	Yes	Local/Regional	>20
ID3-3	Boise River WMA 2	High	mule deer/wolf/badger/golden eagles, raptors, bald eagles, quail	Yes	Yes	Local/Regional	>20
ID3-4	Boise River WMA 3	High	mule deer/elk	Yes	Yes	Local/Regional	
ID3-5	Thorn Creek	Moderate	mule deer/elk/mid-sized carnivore species	Yes	No	Regional	
ID3-6	Tailings	Moderate	mule deer/elk	No	Yes	Local	
ID3-7	Mores Creek Summit	Moderate	mule deer/wolf/bull trout/wolf killed on highway				
ID3-8	Bad Bear	Moderate	black bear/bull trout/collisions with black bear				
ID3-9	Beaver Creek	Moderate	mule deer/elk/black bear/mountain lion/wolf/wolverine/bull trout/potential wolverine	No	Yes	Local/Regional	
ID3-10	Lowman	High	mule deer/elk/mountain lion/wolf/mid-sized carnivore species/bull trout/bald eagles/mountain lion killed on highway	Yes	No	Regional	>20
ID3-11	Grand Jean	Moderate	mule deer/elk/marten/bull trout/bald eagles/mountain goat, marten killed on highway	No	Yes	Local	
ID3-12	Eagle Island	Low	mule deer/white tail deer/racoons, skunks, foxes/waterfowl (mallards), pheasants	No	Yes	Local	
ID3-13	Shadow Valley	High	mule deer/racoons/amphibians	No	Yes	Local	
ID3-14	Spring Valley Ranch	High	mule deer/elk/coyote	Yes	Yes	Local/Regional/mule deer year round, elk during hard winters	
ID3-15	Horseshoe Bend Hill	High	mule deer	Yes	Yes	Local/Regional	5-20
ID3-16	Weigh Station	Moderate	mule deer	No	Yes	Local	
ID3-17	Lower Banks	Moderate	mule deer/elk/wintering bald eagles				
ID3-18	Gardena	Moderate	mule deer/elk/coyote	No	Yes	Local/Regional	
ID3-19	Zimmer Creek	Moderate	mule deer/black bear				
ID3-20	Big Eddy	Moderate	mule deer	No	Yes	Local	
ID3-21	Banks	High	elk	Yes	No	Regional/elk winter range	
ID3-22	Lower Crouch	High	mule deer	Yes	Yes	Local	
ID3-23	Banks to Lowman	High	mule deer/white tail deer/elk/wolf/turkeys, bald eagles/1 big horn sheep present	Yes	Yes	Local/Regional	>20
ID3-24	Ion	Low	mule deer/antelope/mountain lion/bobcat/badger/reptiles/sage grouse	No	Yes	Local	
ID3-25	Tree Top Ranch	Low	mule deer/elk/fox/amphibians/turkeys, bald eagles, waterfowl	No	Yes	Local	
ID3-26	49 Slough	Low	amphibians/waterfowl				
ID3-27	Weiser South	Low	mule deer/skunks	No	Yes	Local	

ITD_ID	AOI_NAME	PRIORITY	SPECIES	MIG_POP	LOC_POP	SCALE	HWY_MORT
ID3-28	Weiser River	Low	racoons, skunks/amphibians/Southern Idaho Ground Squirrel (historic site)				
ID3-29	Notus	Low	mule deer/racoons, skunks/barn owls, bald eagles	No	Yes	Local	
ID3-30	Bruneau	Low	mule deer/reptiles/amphibians/waterfowl				
ID3-31	Loveridge	Low	racoons/reptiles/amphibians/waterfowl, eagles				
ID3-32	Mountain Home NW	Low	mule deer/antelope/badger/coyote	No	Yes	Local	
ID3-33	Ditto Creek	Low	mule deer/elk/badger	Yes	No	Regional/elk: heavy winters (1 in 5 winters)	
ID3-34	Indian Creek	Moderate	mule deer/antelope/badger	Yes	Yes	Local/Regional	
ID3-35	Badger Alley	Moderate	badger/raptors				
ID3-36	Black's Creek	Moderate	antelope/badger/coyote/reptiles	No	Yes	Local	
ID3-37	Boise Airport	Moderate	mule deer/elk				
ID3-38	The Flying Y	Moderate	mule deer/canada geese				
ID3-39	Black Canyon	Low	badger/raptors/paiute ground squirrels				
ID3-40	Snake River View	Low	mule deer/badger/racoons, fox/reptiles/amphibians				
ID3-41	Glenwood	Low	mule deer/waterfowl, herons/riverine species	No	Yes	Local	
ID3-42	Firebird North	Low	mule deer/badger/coyote/raptors/paiute ground squirrels				
ID3-43	Freeze Out Hill	Moderate	mule deer	No	Yes		5-20
ID3-44	Big Willow	Low	mule deer/reptiles/amphibians/waterfowl, bald eagle nesting and wintering/Southern Idaho Ground Squirrels	Yes	Yes	Local/Regional	
ID3-45	Black Canyon Dam	Moderate	mule deer/wintering bald eagles	Yes	No	Regional	
ID3-46	Montour	Moderate	Southern Idaho Ground Squirrels	No	Yes		
ID3-47	Horseshoe Bend	Moderate	mule deer/elk	Yes	No	Regional	
ID3-48	Landfill	Low	mule deer/elk/pheasants	Yes, elk	Yes, mule deer	Local/Regional	
ID3-49	Mann Creek	Low	mule deer/general aquatic species/amphibians	No	Yes	Local	
ID3-50	Midvale Hill	Moderate	mule deer/elk/mid-sized carnivores	No	Yes	Local	
ID3-51	Cambridge Canyon	Low	mule deer/marmots	No	Yes	Local	
ID3-52	South Cambridge	Low	mule deer/racoons	No	Yes	Local	
ID3-53	Alpine South	Moderate	mule deer/elk/coyote, fox, skunk/turkeys, california quail	No	Yes	Local	
ID3-54	Mesa	Low	mule deer/elk/black bear/riverine animals, mink	Yes, elk and mule deer	Yes, elk and mule deer	Local/Regional	
ID3-55	Fruitvale Turnoff	Low	mule deer/elk/turkeys, quail, pheasants, skunks, coyote, fox, racoon	No	Yes	Local	
ID3-56	Fort Hall Summit	Moderate	mule deer/elk/moose/black bear/mountain lion/wolf/wolverine/turkey	No	Yes	Local/Ecosystem	
ID3-57	Strawberry	High	mule deer/elk/black bear/wolverine/general aquatic species/beaver	Yes	No	Ecosystem	
ID3-58	Mosquito Creek	High	mule deer/otter/waterfowl/Northern Idaho Ground Squirrels			Ecosystem/USFS landscape linkage	
ID3-59	Mud Creek	High	mule deer/elk/black bear/coyote/Northern Idaho Ground Squirrels/Northern Idaho Ground Squirrels at mp 158	Yes, elk	Yes, mule deer	Local	
ID3-60	Meadow Creek	Low	mule deer/white tail deer/coyote/reptiles/amphibians/waterfowl	No	Yes	Local	

ITD_ID	AOI_NAME	PRIORITY	SPECIES	MIG_POP	LOC_POP	SCALE	HWY_MORT
ID3-61	Smokey Boulder	High	mule deer/elk/moose/wolf/lynx/wolverine/otter/wetland species/waterfowl	Yes, ungulates	No	Ecosystem/USFS landscape linkage	
ID3-62	Stinky Springs	Moderate	mule deer/black bear/mid-sized carnivores	Yes	No	Regional/Ecosystem/Ecosystem linkage until grasslands to Riggins	
ID3-63	Little Salmon	Moderate	mule deer/white tail deer/elk/wolverine/white tail deer at mp 180-183, wolverine to the east of the linkage	Yes, mule deer	Yes, white tail deer	Ecosystem/USFS landscape linkage	
ID3-64	Smiths Ferry South	High	mule deer/elk/moose/black bear/otter/general aquatic species/bald eagles, nesting turkeys	Yes	No	Regional	
ID3-65	Rainbow Bridge	Low	mule deer/elk/black bear/marten/otter/general aquatic species	Yes, mule deer and elk	No	Regional	
ID3-66	Herrick Lane	Moderate	Northern Idaho Ground Squirrels/Northern Idaho Ground Squirrels on east side of highway				
ID3-67	Herrick Hill	Low	mule deer/elk/moose/black bear	Yes	No	Regional	
ID3-68	Clear Creek	Low	mule deer/elk/moose/otter/reptiles/amphibians/beaver, mink	Yes	No	Regional	
ID3-69	Little Donner	High	mule deer/elk/black bear/wolf/mid-sized carnivores/bald eagle nests on both sides of the highway (mp 122)	Yes	No	Regional	
ID3-70	Arling/ Hot Springs Creek	Low	otter/general aquatic species/waterfowl, raptors in the spring/Beaver			Local/Regional/regional for migrating raptors in spring and fall	
ID3-71	Gold Fork	Moderate	mule deer/white tail deer/elk/wolf/coyote/general aquatic species/waterfowl, raptors, great horned owls			Local	
ID3-72	Lake Fork	High	mule deer/white tail deer/elk/wolf/otter/general aquatic species/otter killed on road here	Yes	Yes	Local/Regional	
ID3-73	Lake Fork Merc.	High	elk	Yes	No	Regional	
ID3-74	Elo Road	Low	elk/fox, coyote	Yes	No	Regional	
ID3-75	Little Ski Hill	Moderate	mule deer/white tail deer/elk/moose/mountain lion/wolverine/fox, coyote/great grey owls killed on highway/small mammals	Yes	No	Regional	
ID3-76	Goose Creek	Moderate	mule deer/white tail deer/black bear/mountain lion/turkeys	Yes	Yes, white tail year round	Local/Regional	
ID3-77	Widener's	Low	turkeys				
ID3-78	Maintenance Shed	Low	mule deer	Yes	Yes, mule deer year round in light winters	Local/Regional	
ID3-79	Fegley's House	Low	turkeys, year round				
ID3-80	Brownlee Summit	Low	mule deer/elk/bobcat/cottontail rabbits at mp 13	No	Yes, mule deer	Local	
ID3-81	Jackson's	High	mule deer/elk/black bear				
ID3-82	Andrus WMA	High	mule deer/elk/black bear/racoons, skunks, coyote/snakes killed at camp creek,snake den at mp 5, 9-10/golden eagle nest at mp 11, great horned owl nests at mp 5 and 9/big horn sheep	Yes	Yes	Local/Regional	

ITD_ID	SEASON	ATTRACT	AGENCIES	HWY_SPEC	COMMENT1	COMMENT2
ID3-1			Pvt		mule deer in bad winters, pronghorn cross road into Albertson's parking lot, development is a big threat to this linkage	
ID3-2	Spring/Summer/Fall/Winter/primarily winter road kill problem	winter range	BLM/State IDFG/BOR, Pvt		elk are found in upper end of linkage, safety issue	
ID3-3	Winter/winter range	agriculture fields/winter range	BLM/State IDFG/Corps of Engineers, PVT		safety issue, mp 13-16 high road kill deer area	
ID3-4	Winter/winter range	winter range	BLM/State IDFG/Corps of Engineers, PVT		mostly elk, but some mule deer, primarily in the winter	
ID3-5	Winter/winter range		USFS/Pvt		animals coming off ot the major ridge during winter	
ID3-6	Spring/Summer/bad during dry summers because animals going to water/Fall/Winter	water - riparian			safety issue, straight stretch with higher vehicle speeds	
ID3-7	Spring/Summer/Fall		USFS		wolf killed on highway, mule deer attracted to green grass along the highway	
ID3-8	Spring/Summer/Fall	water - riparian/campgrounds draw bears in	USFS		narrow, winding road	
ID3-9	Spring/Summer/Fall	green grass and minerals along roadway	USFS			
ID3-10	Winter/winter range	winter range	USFS/Pvt		elk are primarily east of Lowman	
ID3-11		water - riparian				
ID3-12	Spring/Summer/Fall/Winter	water - riparian			lose a lot of deer at the rivers	
ID3-13	Summer/mid to late summer	agriculture fields/water - riparian/golf course			turn bank installed last year, reduced passing opportunity, safety issue because of increased vehicle speeds and traffic	
ID3-14	Spring/Summer/Fall/Winter/elk during hard winters	agriculture fields			safety isssue, straight stretch, increased speeds, south bound is faster	
ID3-15	Spring/Summer/Fall/Winter		Pvt		improved highway, commuter traffic and weekend traffic, increased ADT, safety issue	
ID3-16	Spring/Summer/Fall/Winter	alfalfa fields/maintenance mother feeds deer	Pvt		safety issue	
ID3-17			BLM/USFS/State IDFG		high accident rate	
ID3-18		alfalfa fields				
ID3-19					collisions	
ID3-20					not a lot of collisions (3)	
ID3-21	Winter/winter range	historical feeding area, not fed anymore				
ID3-22		pasture				
ID3-23	Spring/Summer/Fall/Winter/winter range, most highway problems in winter		USFS/Pvt		safety issue, wolves crossing the road	
ID3-24	Spring/Summer/Fall/Winter		BLM/State IDFG		not a safety issue, low traffic volume	
ID3-25		agriculture fields/water - riparian			wetland haibtat along the Boise River	
ID3-26		water - riparian			wetlands	
ID3-27		water - riparian			Snake river	

ITD_ID	SEASON	ATTRACT	AGENCIES	HWY_SPEC	COMMENT1	COMMENT2
ID3-28		water - riparian			riparians	
ID3-29		water - riparian			wetlands associated with the Boise River	
ID3-30		water - riparian			wetlands, CJ Strike WMA	
ID3-31						
ID3-32	Spring/Summer/Fall/Winter		BLM		good public land corridor across the highway, badger get hit a lot	
ID3-33	Winter/during heavy winters	low evlevation	BLM/Pvt			
ID3-34		water - riparian	BLM/Pvt		mule deer hit on road, wetland area	
ID3-35			BLM			
ID3-36			BLM /Pvt			
ID3-37					huge safety issue, IDFG doesn't want animals in this area, animals access the interstate via the irrigation canals	
ID3-38					big safety issue, IDFG doesn't want animals in this area, they get trapped in the interchange	
ID3-39						
ID3-40		water - riparian			big box culvert under highway, possible wildlife passage?	
ID3-41		water - riparian			~2 mule deer hit per year	
ID3-42					mule deer hit in the bottom	
ID3-43		agriculture fields/water - riparian/orchards	BLM/Pvt			
ID3-44		agriculture fields/water - riparian	Payette WMA/Pvt			
ID3-45	Winter/winter range	water - riparian				
ID3-46						
ID3-47		water - riparian/winter range			low traffic road, with increasing traffic there will be a problem, residential developments are happening, even up towards Sweet	
ID3-48	Spring/Summer/Fall/Winter	agriculture fields, south side	BLM/State IDFG/Pvt			
ID3-49	Summer/deer come down in the summer to the agriculture fields	agriculture fields				
ID3-50	Spring/Summer/Fall	agriculture fields	BLM/Pvt		elk- summer, mule deer- summer and fall, east side elk crossing, west side mule deer crossing	
ID3-51	Spring/Summer/Fall	water - riparian	BLM/Pvt			
ID3-52	Spring/Summer	agriculture fields				
ID3-53	Spring/Summer/Fall				highway safety issue	
ID3-54		agriculture fields/water - riparian			good sized bridge for under highway movement that bears may use, possible location for fencing animals under the bridge	
ID3-55	Spring/mule deer/Summer/mule deer/Fall/mule deer					
ID3-56	Spring/Summer/Fall/Winter/elk in winter only, especially at the blind curve		USFS/Pvt		highway safety issue, tight curves, poor visibility, historical USFS wolverine area	
ID3-57	Summer/Fall		USFS/State IDFG		highway safety issue, USFS linkage area	
ID3-58		water - riparian			marshy areas on both sides of the road, highway safety issue	
ID3-59						
ID3-60	Spring/Summer/Fall	water - riparian/golf course			wetlands area	

ITD_ID	SEASON	ATTRACT	AGENCIES	HWY_SPEC	COMMENT1	COMMENT2
ID3-61	Spring/ungulates/Summer/ungulates/Fall/ungulates	water - riparian	Pvt		potential road impacts to anadromous salmon, elk crossing mp 168-170, highway safety issue	
ID3-62		water - riparian				
ID3-63						
ID3-64	Spring/Summer/Fall				highway safety issue, there is concern with bald and golden eagles feeding on road kill carcasses and getting hit by vehicles, need to pull carcasses far away from the roadway	
ID3-65	Spring/Summer/Fall					
ID3-66						
ID3-67	Spring/Summer/Fall					
ID3-68	Spring/Summer/Fall	agriculture fields/water - riparian			wetlands	
ID3-69	Spring/Summer/Fall		State IDFG/Pvt		highway safety issue	
ID3-70	Spring/raptors/Fall/raptors/Winter/otter	water - riparian			wetland area	
ID3-71		water - riparian	Pvt		wetland area	
ID3-72		water - riparian			wetland area	
ID3-73	Summer/Fall	agriculture fields			elk cross roadway to feed in fields, highway safety issue	
ID3-74		agriculture fields				
ID3-75	Spring/Summer/Fall					
ID3-76	Spring/Summer/Fall/Winter/white tail deer and turkeys	garbage and - or human feeding				
ID3-77	Winter/feed turkeys in winter	feed turkeys			turkeys killed on highway in winter	
ID3-78	Spring/Summer/Fall					
ID3-79	Spring/Summer/Fall/Winter	human feeding of turkeys				
ID3-80						
ID3-81			State IDFG		Cecil Andrus WMA	
ID3-82	Winter/winter range	black bears associated with old fruit trees	BLM/State IDFG		Cecil Andrus WMA, fish barrier at camp creek to main brownlee	

ITD_ID	AOI_NAME	PRIORITY	SPECIES	MIG_POP	LOC_POP	SCALE	HWY_MORT	SEASON
ID4-1	Hill City	Moderate	mule deer/elk/antelope/wolverine/mid-sized carnivore species	Yes	Yes	Local/Ecosystem		
ID4-2	Camas Prarie	Moderate	mule deer/elk/antelope/black bear/mid-sized carnivore species/reptiles/western toad/raptors/beaver, small carnivores, black bear killed on highway 1 mile east of Fairfield	Yes	Yes	Local/Regional		Spring/Summer/Fall/Winter
ID4-3	County Line	Moderate	mule deer/antelope/wolf/mid-sized carnivore species/redband trout, wood river sculpin/sage grouse/redband trout, wood river sculpin/resident rainbow trout, whitefish	Yes, mule deer	Yes	Local/Regional		Spring/Summer/Fall/Winter
ID4-4	Moonstone	High	mule deer/elk/moose/wolf/badger/mid-sized carnivore species/redband trout, wood river sculpin/wintering bald eagles, nesting golden eagle, raptors/redband trout, wood river sculpin/resident rainbow	Yes, mule deer	Yes	Local/Regional/heavy mule deer migration, connectivity of BLM lands, widest migration corridor north of Interstate and Snake River	>20	Spring/Summer/Fall/Winter
ID4-5	Silver Creek	Moderate	mule deer/moose/see comments/amphibians/waterfowl, cranes, bald eagle, heron rookery/beaver	No	Yes	Local		Spring/Summer/Fall/Winter
ID4-6	Queens Crown	High	mule deer/raptors	Yes, mule deer	No	Regional	>20	Spring/migration corridor/Winter/migration corridor
ID4-7	Malcomson's	High	mule deer/elk/antelope/black bear/mountain lion/wolf/wolverine/badger/sage grouse/major sage grouse area, wolverines north of highway, black bear killed at mp 126 two years ago	Yes, mule deer and elk	Yes	Regional		Spring/migration corridor/Winter/migration corridor
ID4-8	Milepost 126	Moderate						
ID4-9	Little Camas	Moderate	mule deer/elk/black bear/wolf/mid-sized carnivore species	Yes	No	Regional		
ID4-10	Rattlesnake	Moderate	mule deer	Yes, heavy mule deer	No	Regional/heavy mule deer migration		Spring/migration/Winter /migration
ID4-11	I84 Corridor	High	mule deer/elk/moose/antelope/bobcat/mid-sized carnivore species/sage grouse, sharptail grouse, raptors	Yes		Ecosystem/major historical mule deer migration severed, mp 254-263- two mountain ranges come together, historically 4000 mule deer crossed, mp 270-275 majority of elk hit	>20	Spring/Summer/Fall/Winter
ID4-12	Raft River	Low	moose/antelope/mid-sized carnivore species/barn owls/occasional moose at mp 237	No	Yes	Local		
ID4-13	Salt Lake Interchange	Moderate	mule deer/elk/antelope/badger/mid-sized carnivore species/barn owls/lots of antelope	Yes	Yes	Local/Ecosystem/linkage of sagebrush from north to south of Snake river, migrate between Snake River and Mountain Ranges		Spring/Summer/Fall/Winter
ID4-14	Gifford Springs	Low	elk/waterfowl	No	Yes	Local		
ID4-15	Devil's Corral	High	mule deer/white tail deer/antelope/badger/mid-sized carnivore species/barn owls/marmots	Yes, mule deer winter movements	Yes	Regional/movements during extreme winters	5-20 (deer)	Spring/Summer/Fall/Winter/extreme winters
ID4-16	Malad	Low	mule deer/elk/badger	Yes	Yes, mule deer at Malad river		>20	Winter/extreme winters
ID4-17	Bliss Rest Area	High	mule deer/elk/antelope/badger/fox, racoons/barn owls	Yes	No	Regional	>20	Winter/occurs every winter, more on heavy winters
ID4-18	Hammett	Low	mule deer/elk/badger	Yes, more so than local population	Yes	Local/Regional/more migratory mule deer than local		
ID4-19	Mike's Badger Area	Low	badger/reptiles/ground squirrels, snakes					
ID4-20	North Shoshone Canal	Low	mule deer	No	Yes	Local		

ITD_ID	AOI_NAME	PRIORITY	SPECIES	MIG_POP	LOC_POP	SCALE	HWY_MORT	SEASON
ID4-21		Low	mule deer/elk/antelope/badger/coyote/pygmy rabbits at northern end	No	Yes	Local/crossing from one side of highway to another	5-20	Spring/Summer/Fall/Winter
ID4-22	Timmerman	High	mule deer/elk/badger/coyote/rattlesnakes/pygmy rabbits	Yes	Yes			
ID4-23	Bellvue	High	mule deer/elk/moose/badger/fox, coyote, major skunk migration	No	Yes	Local		Spring/Summer/Fall/Winter
ID4-24	Deer Creek	High	mule deer/elk/fox, skunk	No	Yes	Local	>20	Spring/Summer/Fall/Winter
ID4-25	Ketchum	High	mule deer/elk/moose/black bear/mountain lion/badger/fox, skunk	No	Yes	Local	>20	Spring/Summer/Fall/Winter
ID4-26	Phantom Hill	Low	mule deer/elk/moose/mountain lion/bobcat/wolf/wolverine/badger	Yes (east to west)	Yes	Regional/Ecosystem/migrate to the west, local populations in spring, summer, and fall		Spring/Summer/Fall
ID4-27	Fourth of July Creek	Low	mule deer/elk/antelope/badger	Yes	Yes	Local/Regional		
ID4-28	Galena Summit	Low	mule deer/elk/mountain lion/lynx/wolverine	Yes	Yes	Ecosystem		Spring/Summer/Fall/Winter
ID4-29	Shoestring Road	Low	mule deer/antelope/badger/sage grouse	Yes (severe winters)	No		>20	
ID4-30	Turkey Lake	Low	mule deer/antelope/coyotes/rattlesnakes/sage grouse/jack rabbits	Yes (mule deer migration across highway at top end, mp 25-26)	Yes	Local		
ID4-31	Baker Flat	Low	mule deer/elk/badger/coyote/salamanders/waterfowl, sage grouse/pygmy rabbits	Yes	Yes	Local/Regional		Spring/Summer/Fall/Winter
ID4-32	Johnson Hill	Moderate	mule deer/elk/antelope/fox/sage grouse, sandhill cranes, geese, swans/sage grouse lek at mp 37-38	Yes (mule deer and antelope)	Yes (mule deer and elk)	Local		
ID4-33	Point Ranch	Low	mule deer/antelope/badger/mid-sized carnivore species/sage grouse, chukar/big horn sheep (recently)	No	Yes	Local/Regional		Spring/Summer/Fall/Winter
ID4-34	Salmon Tracts	Low	badger/raptors/rabbits	No	Yes	Local		
ID4-35	Notch Butte	Low	mule deer/antelope	No	Yes	Local		Winter
ID4-36	Marley Bridge	Moderate	mule deer	Yes	Yes	Local/Regional		
ID4-37	Pagari	Moderate	mule deer/elk/sage grouse	No	Yes	Local		
ID4-38	Hot Springs	Low	mule deer/antelope/bobcat/mid-sized carnivore species/raptors, sage grouse/nude bathers	Yes	Yes	Local/Regional		
ID4-39	Carey Lake	Low	mule deer/bobcat/waterfowl, bald eagle	Yes	Yes	Local/Regional		
ID4-40	Lava Lake	Low	mule deer/antelope/sage grouse	Yes (antelope)	Yes	Local/Regional		
ID4-41	Bliss Grade	Low	mule deer	Yes	Yes			
ID4-42	Malad River	Low	general fish species/reptiles/amphibians					
ID4-43	Hagerman	Low	mule deer/waterfowl/mink, muscrat, porcupine	No	Yes		>20	Spring/Summer/Fall/Winter
ID4-44	Salmon Falls Creek	Low	mule deer/badger/mid-sized carnivore species/fur bearers	No	Yes (mule deer)	Local		Spring/Summer/Fall/Winter
ID4-45	East Bliss	Low	mule deer/elk/antelope/badger/reptiles/amphibians/raptors, owls, pheasants/rabbits get hit, racoons on Malad	Yes	Yes	Local/Regional		Spring/Summer/Fall/Winter
ID4-46	Shoshone West	Moderate	mule deer/antelope/badger/marmot	Yes	Yes	Local/Regional		Spring/Summer/Fall/Winter/winter range
ID4-47	Dietrich	Low	mule deer/antelope/mourning doves, barn owls	Yes	Yes			Spring/Summer/Fall/Winter/some use as winter range
ID4-48	Kamima	Moderate	mule deer/antelope/mid-sized carnivore species/sharp tail grouse, sage grouse, pheasants	Yes	Yes	Local/Regional		Spring/Summer/Fall/Winter/major winter range west of linkage
ID4-49	Connor	Moderate	mule deer/elk/mountain lion/mid-sized carnivore species/sage grouse, turkey	No	Yes	Local		Spring/Summer/Fall/Winter
ID4-50	East Burley	Low	mule deer/coyote/wintering bald eagles, waterfowl	No	Yes	Local		
ID4-51	25-50 Junction	Moderate	mule deer/antelope/badger/mid-sized carnivore species/pheasants (game birds)	Yes	Yes	Local/Regional		
ID4-52	Valley	Moderate	mule deer/fox	Yes	Yes (few mule deer)	Local/Regional		

ITD_ID	ATTRACT	AGENCIES	HWY_SPEC	COMMENT1	COMMENT2
ID4-1	upland	Pvt		wolverine hit on highway at Hill City	
ID4-2	agriculture fields/sagebrush	Pvt		black bear up and down Soldier Creek	
ID4-3	agriculture fields/water - riparian	BLM/Pvt		perched culvert at Willow Creek, ITD is aware of	
ID4-4	agriculture fields/sagebrush	BLM/Pvt		High priority safety issue, most important migration corridor north of the Snake River	
ID4-5	agriculture fields/water - riparian	BLM/Pvt, TNC land easements		Divide for fish species at highway 75: West of 75- sport fish (brown trout), mountain white fish, sculpin, possibly leathersides, boreal toad; East of 75- brown trout, rainbow trout, white fish, no leatherside, northern leopard frog, spotted frogs,	(continued from Comment1) ... boreal toad
ID4-6	agriculture fields/water - riparian/more of a migration route	BLM/Pvt along highway		Highway safety issue, very high mule deer area, housing development is threatening this area	
ID4-7		BLM/Pvt mainly		High priority safety issue, high speed, game crossing (culvert) at mp 126, not utilized due to cattle and sheepman fencing it off with sheep fence	
ID4-8				Game crossing site, fenced, not used at all	
ID4-9		BLM/USFS/Pvt		deer killing road, lights(?)	
ID4-10	migration	BLM/Pvt			
ID4-11	agriculture fields/cover	BLM/USFS/Pvt		high volume, high speed, safety issue	
ID4-12	agriculture fields/water - riparian	BLM/Pvt			
ID4-13	agriculture fields/water - riparian	BLM/State IDFG/Pvt			
ID4-14	water - riparian	BLM/USFWS/Pvt		Minidoka USFWS wildlife refuge	
ID4-15	agriculture fields/cover/sagebrush			barn owls- mp 168-188, hot spot 177-179, but get hit 173-180	
ID4-16	sagebrush corridor	State Park	mule deer, 20 killed/ year at mp 146-147	Resident mule deer at Malad River	
ID4-17	agriculture fields/water - riparian/cover		major deer issue	Needs jump out chutes from highway right of way	
ID4-18	agriculture fields/water - riparian				
ID4-19				High badger kill area	
ID4-20				concrete sided canal, forces deer onto highway, highway acts as a bridge across the flume	

ITD_ID	ATTRACT	AGENCIES	HWY_SPEC	COMMENT1	COMMENT2
ID4-21		BLM/Pvt		No linkage name recorded	
ID4-22	agriculture fields/sagebrush			safety issue, mp 101 high concentration because they get stuck in between cut, cross between farmland and sagebrush, chased across highway by hunters	
ID4-23	agriculture fields/human feeding of elk	Pvt		cameras on bridges, mp 101 to town of Ketchum, Western Transportation Institute study in progress	
ID4-24		Pvt	mule deer	safety issue	
ID4-25	agriculture fields/water - riparian			safety issue	
ID4-26		USFS			
ID4-27				antelope winter in the east fork of the Salmon river	
ID4-28		USFS		potential lynx area	
ID4-29	limited sagebrush	BLM/State IDFG		safety concern, high mortality, especially in severe winters	
ID4-30		BLM			
ID4-31	water - riparian	BLM/State IDFG		wetland complex	
ID4-32		BLM		pond at mp 43, canada geese and nesting swans	
ID4-33	agriculture fields/water - riparian	BLM/State IDFG		mp 10-13 hot spot because of terrain issues and watering places, safety issue	
ID4-34				installed culvert in this section for cross-ditching, could be used for badgers	
ID4-35				burned	
ID4-36	agriculture fields/water - riparian/sagebrush	BLM		mp 175-176, hay field, deer congregate at night	
ID4-37	agriculture fields/water - riparian			sage grouse at mp 190 (southern end of linkage area), use to be a lot of elk, pushed north, don't cross as frequently, highway between river and sagebrush	
ID4-38					
ID4-39	water - riparian	State IDFG		wetlands area	
ID4-40					
ID4-41					
ID4-42	water - riparian			commercial lizard and reptile collectors in this area	
ID4-43	water - riparian	State IDFG		WMA, waterfowl hit on the road by the WMA	
ID4-44	agriculture fields/water - riparian				
ID4-45	agriculture fields	BLM/Pvt			
ID4-46		BLM		mp 162-163 deer north and south everyday	
ID4-47				railroad problems along hwy 24	
ID4-48	agriculture fields (both sides of road)/some sagebrush			railroad will kill 300-400 during bad winters, very low traffic/ volume road, would be a safety issue with increased traffic	
ID4-49	agriculture fields/water - riparian/sagebrush			mountain pass, mule deer come out of river at mp 1-7	
ID4-50	agriculture fields/water - riparian			islands off the Snake River	
ID4-51	agriculture fields			winter range	
ID4-52					

ITD_ID	AOI_NAME	PRIORITY	SPECIES	MIG_POP	LOC_POP	SCALE	HWY_MORT
ID5-1	Price Corner	Low	mule deer/elk/moose	Yes, mule deer	No	Local	>20
ID5-2	Topaz	Low	mule deer/moose	Yes, mule deer	No	Local	>20
ID5-3	Fish Creek	High	mule deer/mountain lion	Yes, mule deer	Yes, mule deer	Local	>20
ID5-4	Alexander Reservoir	High	mule deer/moose/mountain lion/badger/skunks, racoons, /small carnivores	Yes, mule deer	Yes, mule deer, moose	Local	
ID5-5	Georgetown Summit	Low	mule deer/elk/mid-sized carnivore species/bald eagles, golden eagles	Yes, elk	Yes, mule deer	Local/Ecosystem/especially for carnivores from the Greater Yellowstone Ecosystem	
ID5-6	Ranch Hand	Low	mule deer/elk/moose	Yes, elk and moose	Yes, mule deer		
ID5-7	Rocky Point	High	mule deer/elk/lynx (historical)/reptiles/amphibians/bald eagles (April and November)/small mammals	Yes, mule deer and elk	No	Ecosystem/migratory from the GYE to the south	>20
ID5-8	Border	Low	cutthroat/native fish species of concern/reptiles/amphibians/waterfowl and shorebirds	No	Yes, aquatic species	Local	
ID5-9	Malad Face	High	mule deer/elk/coyote and foxes	Yes, mule deer and elk		Regional	>20
ID5-10	Malad Summit	Moderate	mule deer/elk/black bear/mountain lion/mid-sized carnivore species	Yes	Yes	Regional	
ID5-11	Marsh Creek	Low	amphibians/waterfowl	No	Yes, aquatic species	Local	
ID5-12	Indian Rocks	Low	mule deer/bobcat/coyote/ground squirrels, marmots	Yes, mule deer	Yes	Local	
ID5-13	Black Rock	High	mule deer/moose/mountain lion/mid-sized carnivore species/small carniore species	Yes, mule deer	Yes	Local/some mule deer cross back and forth	>20
ID5-14	Hells Half Acre South	Low	mule deer/elk/reptiles/small mammals	No	Yes	Local/lava flow and snake river bottom	
ID5-15	Hells Half Acre North	Low	mule deer/white tail deer/historically antelope	No	Yes	Local	
ID5-16	Bear Lake West	Moderate	mule deer/elk/moose/cutthroat/amphibians/bonneville cutthroat, amphibians associated with Bear Lake	Yes, mule deer	Yes	Local	
ID5-17	Bear River	Low	mule deer/moose/mountain lion/reptiles/amphibians/waterfowl and shorebirds/muscrat, beaver	No	Yes	Local/major river corridor	
ID5-18	Montpelier Canyon	High	mule deer/elk/moose/mountain lion/mid-sized carnivore species/reptiles/amphibians/road killed rubber boa	Yes, mule deer	Yes		
ID5-19	Lower Thomas Fork	Low	cutthroat/native fish species of concern/small mammals, bonneville cutthroat				
ID5-20	Upper Thomas Fork	Low	cutthroat/native fish species of concern/small mammals, bonneville cutthroat				
ID5-21	Cub River	Low	mule deer/pick up foxes, skunks, and racoons/cutthroat/native fish species of concern/reptiles/amphibians	No	Yes	Local	
ID5-22	Battle Creek	Low	mule deer/amphibians/turkeys/turkeys hit on road	No	Yes	Local	>20

ITD_ID	AOI_NAME	PRIORITY	SPECIES	MIG_POP	LOC_POP	SCALE	HWY_MORT
ID5-23	Red Rock Pass	High	mule deer/elk/mid-sized carnivore species/amphibians/waterfowl production, golden eagles on road killed deer, swans/wetlands, rivers, and streams	Yes, mule deer and elk	No	Local	
ID5-24	Wolverine	Low	mule deer/white tail deer/moose/mid-sized carnivore species/small mammals	No	Yes	Local/movement from desert to wetland bottoms	
ID5-25	Riverdale	Moderate	mule deer/elk/amphibians/turkeys/riparian species	Yes, mule deer	No	Local	
ID5-26	Strawberry	Moderate	mule deer/elk/moose/mountain lion/bobcat	Yes	No	Ecosystem/high connectivity area for large animals	<5
ID5-27	Liberty	Low	mule deer/elk/moose/mountain lion/mid-sized carnivore species/reptiles/amphibians/coots, waterfowl associated with river and wetlands/aquatic species	No	Yes, mule deer	Local/resident mule deer population highway problem	
ID5-28	Treasureton	Low	mule deer/reptiles/amphibians/waterfowl, turkeys	Yes, mule deer	Yes, mule deer	Local/local populaton and also migratory population during winter	
ID5-29	Treasureton Summit	Low	mule deer/elk	No	Yes, mule deer	Local/elk cross at the summit	
ID5-30	Cleveland	Low	mule deer/reptiles/amphibians	No	Yes	Local/large river	
ID5-31	Trout Creek	Low	native fish species of concern/amphibians/shorebirds	No	Yes	Local/wetlands	
ID5-32	Grace	Low	mule deer/elk/native fish species of concern	Yes	No	Local/winter range on sagebrush flat	
ID5-33	Monsanto	Moderate	mule deer	Yes	No	Ecosystem/migration corridor for 5000 deer (NE to SW)	5-20
ID5-34	China Hat	Low	elk/cutthroat/eagles/Blackfoot river, riverine species, yellowstone cutthroat	Yes	No	Ecosystem/migratory movment, Blackfoot river	
ID5-35	Henry	Low	reptiles/amphibians/water related/major riverine habitat				
ID5-36	Grays Lake	Low	mule deer/elk/moose/black bear/sandhill crane population, nesting/ breeding waterfowl/small mammals	No	Yes	Local	
ID5-37	Tin Cup Creek	Moderate	mule deer/elk/moose/black bear/mountain lion/cutthroat/native fish species of concern/amphibians/yellowstone cutthroat, beaver dams, fish passage issues	Yes	Yes	Ecosystem/major connection between Yellowstone and the Uintas	
ID5-38	Coldwater/ Massacre Rock	Moderate	mule deer/antelope/badger/native fish species of concern/eagles/medium predators	Yes	Yes	Local/Snake river parallels the highway	
ID5-39	Bannock Creek	Low	mule deer/reptiles/ amphibians/water related/carnivores	No	Yes	Local	
ID5-40	Portneuf River	Low	mule deer/waterfowl (geese)/furbearers, wetland related species	No	Yes	Local	
ID5-41	Root Hog	Low	mule deer/elk/antelope/sage grouse/pygmy rabbits/carnivores	Yes, antelope, sage grouse, and some mule deer	Yes	Local	
ID5-42	Curlew	Low	mule deer/snakes/amphibians/sage grouse, sharptail grouse/small mammals	No	Yes	Local	
ID5-43	Holbrook	Low	mule deer/mid-sized carnivore species/sage grouse, sharptail grouse/rabbits	Yes	Yes	Ecosystem/exchange of animals across the road	
ID5-44	Springfield	Low	reptiles/amphibians/shorebirds, wintering waterfowl/pheasants	No	Yes	Local	

ITD_ID	SEASON	ATTRACT	AGENCIES	HWY_SPEC	COMMENT1	COMMENT2
ID5-1	Winter/winter range	water - riparian		mule deer	Designing two bridges at mp 363-364 for wildlife movement	
ID5-2	Winter/winter range/ seasonal migrations		BLM/Pvt	mule deer	Topaz bridge (new) at mp 365	
ID5-3	Spring/Summer/Fall/Winter/winter range/ sage juniper habitat	agriculture fields (both sides of highway)/water - riparian	BLM/Pvt	mule deer, killed all year, primarily during winter	Deer fence (10 strand wire, no mesh) with 3 underpasses for wildlife built in 1979-1980, there are escape shoots, wildlife crossings work and don't work, have found bullet holes on sides of structures	
ID5-4	Spring/Summer/Fall/Winter/winter range	agriculture fields/water - riparian	BLM/USFS/Pvt	mule deer		
ID5-5	Spring/Summer/Fall/Winter/elk use mainly during winter	agriculture fields/water - riparian	USFS/Pvt			
ID5-6	Spring/mule deer/Summer/mule deer/Fall/mule deer/Winter/elk and moose	agriculture fields (CRP fields)/water - riparian	Pvt		Put up signs in area?	
ID5-7	Winter/major migration route for mule deer (2000-4000 annually), ~200 elk winter near road	agriculture fields/water - riparian	BLM/State IDFG/Pvt	mule deer	Serious highway safety issue, 2000-40000 mule deer cross this linkage, several hundred elk winter near the road, heavy time of highway mortality is November and April (mule deer migration timing), possible issues with small mammals, amphibians,	(continued from Comment1) ... and reptiles, pilot project
ID5-8		water - riparian	BLM/Pvt		Wetlands on both sides of highway, fish passage concerns	
ID5-9	Winter/50-85 elk during bad winters	agriculture fields	USFS/Pvt		Human safety issue	
ID5-10	Spring/Summer/Fall/Winter	natural divide, ridge	USFS/Pvt		Significant barrier to movement	
ID5-11		water - riparian	Pvt		Important wetland habitat with a highway through it, there is a bridge present	
ID5-12	Spring/Summer/Fall/Winter/Few more during winter	sagebrush flat	BLM		No deer migration between USFS lands	
ID5-13	Winter/Winter Range	feed along highway	BLM/Pvt		Occasional moose, mountain lion hit at mp 63, probably was a historical linkage (not necessarily now)	
ID5-14	Spring/Summer/Fall/Winter	agriculture fields/water - riparian	Pvt		Snake river bottom, very dry habitat	
ID5-15			BLM		White tail deer in Snake River corridor	
ID5-16	Spring/Summer/Fall/Winter/mule deer in winter	water - riparian	USFWS/Pvt		Fish passage issues at St. Charles (2 crossings), Fish Haven, and Spring Creek between mp 8 and 9, not necessarily a linkage, but mule deer come down in winter	
ID5-17	Spring/Summer/Fall/Winter	water - riparian	Pvt		Major river corridor	
ID5-18	Spring/Summer/Fall/Winter	water - riparian	USFS/State IDFG		Same population of deer that crosses highway 30, eastern side of linkage area is mirgration corridor, western side of linkage area is winter range, elk on eas side	
ID5-19		water - riparian			Fish passage problems	
ID5-20		water - riparian			Fish passage problems	
ID5-21	Spring/Summer/Fall/Winter	water - riparian	ITD wetland project		Recent new bridge (10-12 feet high), Bill Ruediger says it probably needs fencing, bridge 60-70 feet long, 30 acre wetland project (south of river), wetlands west side of highway, large overflow culverts, mule deer get hit on the road all year	
ID5-22	Spring/Summer/Fall/Winter	water - riparian		mule deer	New bridge installed one year ago (water underneath entire bridge span), archaelogical site, national monument, Bear River Bottum	

ITD_ID	SEASON	ATTRACT	AGENCIES	HWY_SPEC	COMMENT1	COMMENT2
ID5-23	Winter/mule deer and elk in winter	agriculture fields/water - riparian	Pvt			
ID5-24	Spring/Summer/Fall/Winter	agriculture fields/water - riparian		mule deer	Movements from desert to wetland bottoms	
ID5-25	Winter/mule deer winter range	winter range	Pvt	mule deer	Highway safety issue, signs erected in winter, sight distance issue	
ID5-26			USFS		Not a high road kill accident area, slower speed limit with lots of curves, light vehicle traffic, it is a high connecitivity and movement area	
ID5-27	Spring/Summer/Fall/Winter	agriculture fields				
ID5-28	Spring/Summer/Fall/Winter	agriculture fields/water - riparian	Pvt		Large fire recently	
ID5-29	Spring/Summer/Fall/Winter		Pvt			
ID5-30	Spring/Summer/Fall/Winter	water - riparian	Pvt			
ID5-31		water - riparian				
ID5-32	Winter/winter range on sagebrush flat	water - riparian	Pvt			
ID5-33	Winter/migrate across to winter range		Pvt	mule deer	Development north of Soda Springs more of an issue, highway safety issue, migration corridor	
ID5-34	Winter				Elk don't get hit on the highway, migratory movement, moving east to west	
ID5-35	Spring/Summer/Fall/Winter		State IDFG		small bridge (30 feet)	
ID5-36	Spring/Summer/Fall/Winter	water - riparian	USFWS		Grays Lake National Wildlife Refuge, a lot of moose present	
ID5-37	Spring/Summer/Fall/Winter		USFS		narrow valley, fish passage issues	
ID5-38	Spring/Summer/Fall/Winter	water - riparian	BLM/State IDFG/USFWS		used to be pronghorn antelope habitat	
ID5-39		water - riparian			Good sized drainage	
ID5-40	Spring/Summer/Fall/Winter	water - riparian			Portneuf River	
ID5-41	Spring/Summer/Fall/Winter	agriculture fields	Pvt		Idaho National Laboratory starts at north end of linkage	
ID5-42	Spring/Summer/Fall/Winter	water - riparian				
ID5-43			BLM		sagebrush, juniper, aspen, chokecherry, very low traffic, wildlife exhchange (connects public, BLM, land)	
ID5-44	Spring/Summer/Fall/Winter	water - riparian			wetland complex, big springs go under highway	

Appendix C – Expert Workshop Participants

District 3 Boise: August 27th, 2007

Name	Organization
Kim Just	Idaho Transportation Department
Greg Burak	Idaho Fish and Game
Elaine Summers	Environmental Protection Agency
Mike Moffett	Local Highway Technical Assistance Council
Scott Reinecker	Idaho Fish and Game
Jerry Deal	Idaho Fish and Game
Gary Moles	Idaho Transportation Department
John Collins	Idaho Transportation Department
Sandy Jacobson	US Forest Service
Jon Rachael	Idaho Fish and Game
Michelle Kemner	Idaho Fish and Game
Bruce Haak	Idaho Fish and Game
Brent Inghram	Federal Highway Administration
Robin Holmquist	Idaho Fish and Game
Lisa Nutt	US Forest Service
Bill Ruediger	Wildlife Consulting Resources
Robin Wall	Geodata Services Inc.
Ken Wall	Geodata Services Inc.
Dave Labar	Idaho Transportation Department
Jill Holderman	Bureau of Land Management
Ed Bottum	Idaho Fish and Game
Nick Petusu	Idaho Transportation Department
Emmett Moore	Idaho Transportation Department
Bill London	Idaho Fish and Game
Scott Rudel	Idaho Transportation Department
Tom Points	Idaho Transportation Department
Johnna Roy	US Fish and Wildlife Service

District 3 McCall: August 29th, 2007

Name	Organization
Greg Burak	Idaho Fish and Game
Gregg Servheen	Idaho Fish and Game
Bill Ruediger	Wildlife Consulting Resources
Ken Wall	Geodata Services Inc.
Robin Wall	Geodata Services Inc.
Mary Faurot	US Forest Service
Diane Evans Mack	Idaho Fish and Game
Ana Egnew	US Forest Service
Anna Owsiak	Idaho Fish and Game

Jeff Rohlman	Idaho Fish and Game
Tim Holden	US Forest Service
Larry Pinkal	Idaho Transportation Department
Jon Almack	US Forest Service

District 4 Jerome: August 23rd, 2007

Name	Organization
Kim Just	Idaho Transportation Department
Scot Stacey	Idaho Transportation Department
Dennis Jensen	Idaho Transportation Department
Dave Dana	Idaho Transportation Department
Billy Dillard	Idaho Transportation Department
Jarrett Porter	Idaho Transportation Department
Tom Kime	Idaho Transportation Department
Trey Mink	Idaho Transportation Department
Steve McCure	Idaho Transportation Department
D. J. Prim	Idaho Transportation Department
Tony Rigby	Idaho Transportation Department
Steve Cole	Idaho Transportation Department
Scott Malone	Idaho Transportation Department
Carl Horn	Idaho Transportation Department
Connie Jones	Idaho Transportation Department
Dan Armstrong	Idaho Transportation Department
Nathan Welch	Wood River Land Trust
Tom Mattix	Idaho Transportation Department
Dan Paiz	Idaho Transportation Department
Joe Kelso	Idaho Transportation Department
Jim Sterling	Idaho Fish and Game
Steve Roberts	Idaho Fish and Game
Travis Feldner	Idaho Fish and Game
Tim Ferguson	Idaho Fish and Game
Jeff Day	Idaho Fish and Game
Mike McDonald	Idaho Fish and Game
Bruce Palmer	Idaho Fish and Game
Greg Milner	Idaho Fish and Game
Meghan Roos	Idaho Fish and Game
Brent Inghram	Federal Highway Administration
Gary Hompland	Idaho Fish and Game
Mike Todd	Idaho Fish and Game
Randy Smith	Idaho Fish and Game
Greg Wooten	Idaho Fish and Game
Mike Stoddard	Idaho Fish and Game
Gary Wright	Bureau of Land Management
Bill Ruediger	Wildlife Consulting Resources

Greg Burak	Idaho Fish and Game
Ken Wall	Geodata Services Inc.
Robin Wall	Geodata Services Inc.
Scott Bailey	Idaho Fish and Game
Brad Lowe	Idaho Fish and Game
Doug Megargle	Idaho Fish and Game
Justin Barrett	Idaho Fish and Game
Devin Rigby	Idaho Transportation Department

District 5 Pocatello: August 21st, 2007

Name	Organization
Gregg Servheen	Idaho Fish and Game
Ed Bala	Idaho Transportation Department
Blake Rindlisbacher	Idaho Transportation Department
David Ovard	US Forest Service
Marsha Truman	Idaho Transportation Department
Ed Hansen	Idaho Transportation Department
George Allen	Idaho Transportation Department
Carl Anderson	Idaho Fish and Game
Corey Class	Idaho Fish and Game
Mark Orme	US Forest Service
Dan Harelson	Idaho Transportation Department
Chris Chapman	Idaho Transportation Department
Paul Wackenhut	Idaho Fish and Game
Alan Wubker	Idaho Transportation Department
Cliff Gould	Idaho Transportation Department
Kit McGurn	Greater Yellowstone Coalition
Mark Gamblin	Idaho Fish and Game
Blake Phillips	Idaho Fish and Game
Patty Cramer	Utah State University
Bill Ruediger	Wildlife Consulting Resources
Greg Burak	Idaho Fish and Game
Ken Wall	Geodata Services Inc.
Robin Wall	Geodata Services Inc.

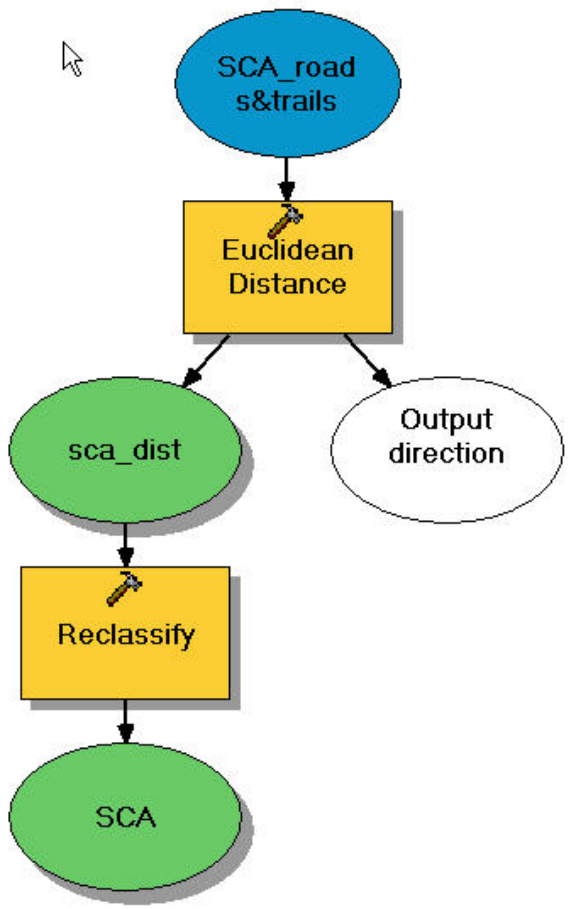
Appendix D – Detailed Wildlife Model Methodology

Secure Core Area

LZ SCA

Data format: ArcToolBox Tool

Abstract: This tool generates the secure core areas (SCA) based on distance from selected roads and high use trails. The euclidian distance to the nearest road segment is calculated for each grid cell and then reclassified as either "In SCA" (greater than 500 meters from a road or high use trail), or "Out of SCA" (within 500 meters of a road or high use trail).



ISO and ESRI Metadata:

- Metadata Information
- Resource Identification Information
- Distribution Information

Metadata elements shown with blue text are defined in the International Organization for Standardization's (ISO) document 19115 *Geographic Information - Metadata.* Elements shown with green text are defined by ESRI and

will be documented as extentions to the ISO 19115. Elements shown with a green asterisk (*) will be automatically updated by ArcCatalog.

Metadata Information

***Last update:** 20071004

Resource Identification Information:

Citation:

Title: LZ SCA

Party responsible for the resource:
Individual's name: Ken Wall
Organization's name: Geodata Services, Inc.
Contact's position:
Contact's role:

Contact information:
Phone:
Voice: (406)532-3239
Fax:

Address:
Delivery point:
1121 E. Broadway, Suite 127
City: Missoula
Administrative area: MT
Postal code: 59802
Country: USA
e-mail address: kwall@geodataservicesinc.com

Descriptive keywords:

Keywords: SCA, secure core area, roads, high use trails

Abstract:
This tool generates the secure core areas (SCA) based on distance from selected roads and high use trails. The euclidian distance to the nearest road segment is calculated for each grid cell and then reclassified as either "In SCA" (greater than 500 meters from a road or high use trail), or "Out of SCA" (within 500 meters of a road or high use trail).

Resource constraints:
Constraints:

Limitations of use:

Distribution Information:

Distributor:

Available format:

Format name: ArcToolBox Tool

Process Steps

Euclidean Distance

Parameters:

Input raster or feature source data:

C:\Data\ITD345\LZModel\MergedRoads_ITD5aoi.shp

Output distance raster:

C:\Data\ITD345\LZ Model\SCA\sca_dist

Output cell size:

30

Reclassify

Parameters:

Input raster:

C:\Data\ITD345\LZ Model\SCA\sca_dist

Reclass field:

Value

Reclassification:

Remap

0 – 500	to	10
500 – 20000	to	1

Output raster:

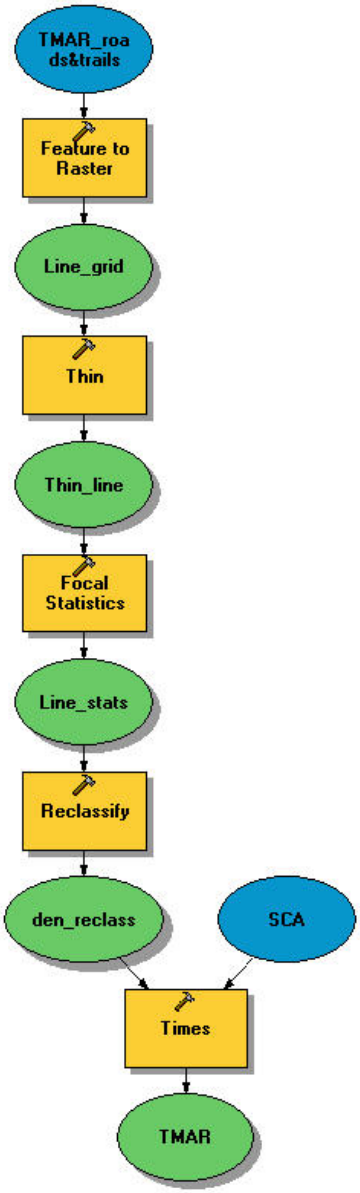
C:\Data\ITD345\LZ Model\SCA\sca

Total Motorized Access Routes

LZ TMAR

Data format: ArcToolBox Tool

Abstract: Uses a "moving window" analysis routine to calculate the road density in the one square mile (circular) area around each grid cell. The road density is then classified into 4 categories - 0 miles/sq. mile, 0.01 - 1 miles/sq mile, 1.01 - 2 miles/sq mile, and > 2 miles/sq mile. Impact values are assigned to each category and then modified based on whether they are in or out of secure core areas (SCA). Impact values for areas out of SCA are increased by one level, and areas within an SCA retain the original value.



ISO and ESRI Metadata:

- Metadata Information
- Resource Identification Information
- Distribution Information

Metadata elements shown with blue text are defined in the International Organization for Standardization's (ISO) document 19115 *Geographic Information - Metadata.* Elements shown with green text are defined by ESRI and will be documented as extentions to the ISO 19115. Elements shown with a green asterisk (*) will be automatically updated by ArcCatalog.

Metadata Information

***Last update:** 20071004

Resource Identification Information:

Citation:

Title: LZ TMAR

Party responsible for the resource:
Individual's name: Ken Wall
Organization's name: Geodata Services, Inc.
Contact's position:
Contact's role:

Contact information:
Phone:
Voice: (406)532-3239
Fax:

Address:
Delivery point:
1121 E. Broadway, Suite 127
City: Missoula
Administrative area: MT
Postal code: 59802
Country: USA
e-mail address: kwall@geodataservicesinc.com

Descriptive keywords:

Keywords: TMAR, total motorized access routes, SCA, secure core areas, roads, trails, road density

Abstract:

Uses a "moving window" analysis routine to calculate the road density in the one square mile (circular) area around each grid cell. The road density is then classified into 4 categories - 0 miles/sq. mile, 0.01 - 1 miles/sq mile, 1.01 - 2 miles/sq mile, and > 2 miles/sq mile. Impact values are assigned to each category and then modified based on whether they are in or out of secure core areas (SCA). Impact values for areas out of SCA are increased by one level, and areas within an SCA retain the original value.

Resource constraints:
Constraints:

Limitations of use:

Distribution Information:
Distributor:

Available format:
Format name: ArcToolBox Tool

Process Steps

Feature to Raster

Parameters:

Input features:

C:\Data\ITD345\LZModel\MergedRoads_ITD5aoi.shp
Field:
GridValue
Output raster:
C:\Data\ITD345\LZModel\TMAR\line_grid
Output cell size:
30

Thin
Parameters:
Input raster:
C:\Data\ITD345\LZModel\TMAR\line_grid
Output raster:
C:\Data\ITD345\LZModel\TMAR\thin_line
Background value:
NODATA
Filter input first:
false
Shape for corners:
SHARP
Maximum thickness of input linear features:
45

Focal Statistics
Parameters:
Input raster:
C:\Data\ITD345\LZModel\TMAR\thin_line
Output raster:
C:\Data\ITD345\LZModel\TMAR\line_stats
Neighborhood:
Circle, 30,CELL
Statistics type:
SUM
Ignore NoData in calculations:
false

Reclassify
Parameters:
Input raster:
C:\Data\ITD345\LZModel\TMAR\line_stats
Reclass field:
Value
Reclassification:
Remap

0	to 1
1 – 53	to 10
54 – 105	to 100
106 – 10000	to 1000
NODATA	to 1

Output raster:
C:\Data\ITD345\LZModel\TMAR\den_reclass
Change missing values to NoData:
false

Times

Parameters:

Input raster or constant value 1:

C:\Data\ITD345\LZModel\TMAR\den_reclass

Input raster or constant value 2:

C:\Data\ITD345\LZModel\SCA\sca

Output raster:

C:\Data\ITD345\LZModel\TMAR\tmar

Operation:

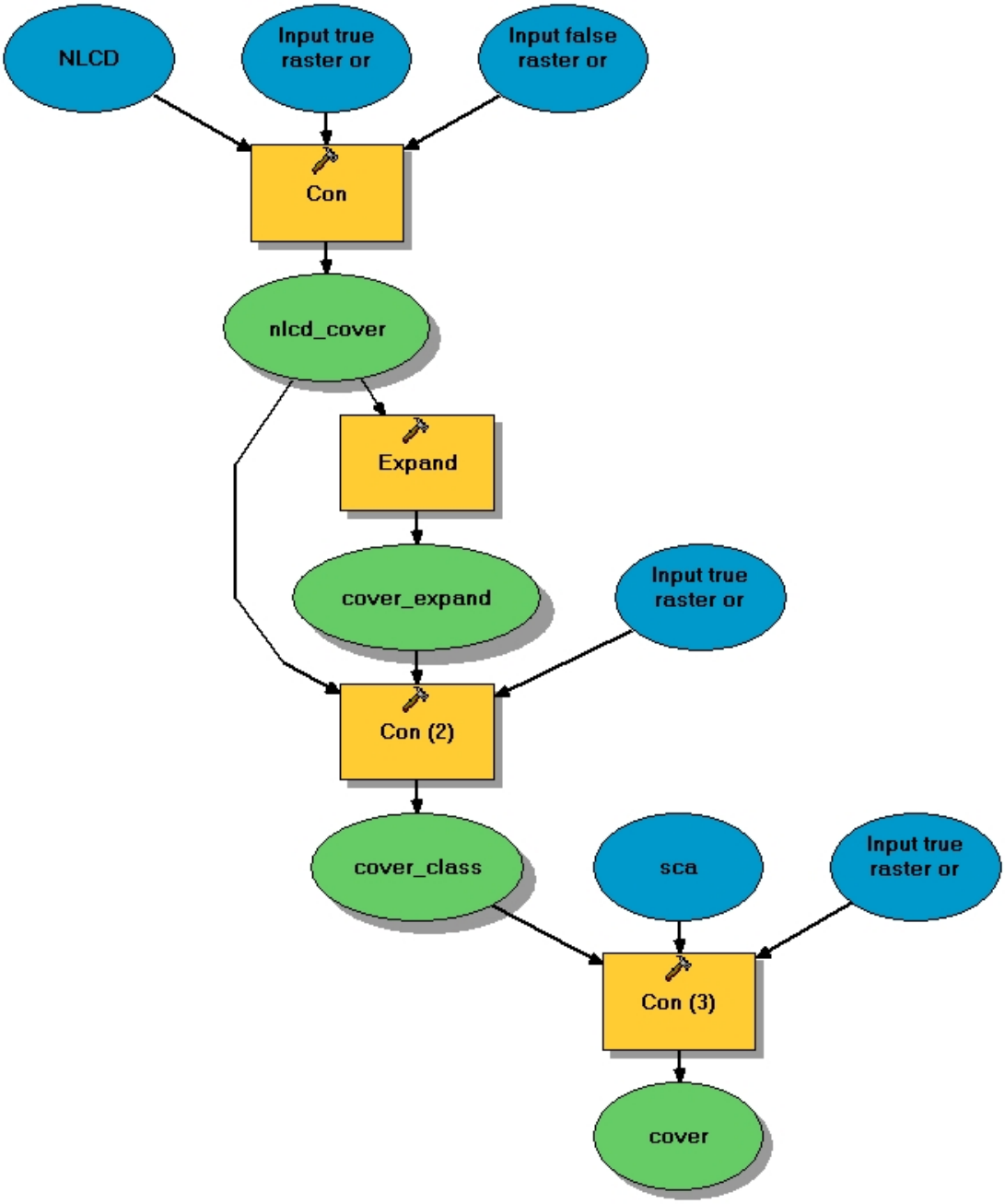
tmar = den_reclass * sca

Hiding Cover

LZ Cover

Data format: ArcToolBox Tool

Abstract: LZ Cover extracts the cover types from the National Land Cover Data that could be considered as hiding cover. A 30 meter edge buffer was created that expanded the hiding cover areas. Finally, the hiding cover values were modified by their location either in or out of secure core areas (SCA). All areas, hiding, edge, or open were classified as hiding within secure core areas. Edge areas outside of a SCA were given an impact rating one level higher than hiding cover and open areas were given a rating of 2 levels higher than hiding cover.



ISO and ESRI Metadata:

- Metadata Information
- Resource Identification Information
- Distribution Information

Metadata elements shown with blue text are defined in the International Organization for Standardization's (ISO) document 19115 *Geographic Information - Metadata.* Elements shown with green text are defined by ESRI and will be documented as extentions to the ISO 19115. Elements shown with a green asterisk (*) will be automatically updated by ArcCatalog.

Metadata Information

***Last update:** 20071004

Resource Identification Information:

Citation:

Title: LZ Cover

Party responsible for the resource:
Individual's name: Ken Wall
Organization's name: Geodata Services, Inc.
Contact's position:
Contact's role:

Contact information:
Phone:
Voice: (406)532-3239
Fax:

Address:
Delivery point:
1121 E. Broadway, Suite 127
City: Missoula
Administrative area: MT
Postal code: 59802
Country: USA
e-mail address: kwall@geodataservicesinc.com

Descriptive keywords:

Keywords: National Land Cover Database, secure core areas, hiding cover, edge, NLCD

Abstract:

LZ Cover extracts the cover types from the National Land Cover Data that could be considered as hiding cover. A 30 meter edge buffer was created that expanded the hiding cover areas. Finally, the hiding cover values were modified by their location either in or out of secure core areas (SCA). All areas, hiding, edge, or open were classified as hiding within secure core areas. Edge areas outside of a SCA were given an impact rating one level higher than hiding cover and open areas were given a rating of 2 levels higher than hiding cover.

Resource constraints:
Constraints:

Limitations of use:

Distribution Information:

Distributor:

Available format:

Format name: ArcToolBox Tool

Process Steps

Con

Parameters:

Input conditional raster:

C:\Data\ITD345\LandCover\nlcd_d5

Input true raster or constant value:

100

Output raster:

C:\Data\ITD345\LZModel\Cover\nlcd_cover

Input false raster or constant value:

10000

Expression:

"Value" = 41 OR "Value" = 42 OR "Value" = 43 OR "Value" = 91

Expand

Parameters:

Input raster:

C:\Data\ITD345\LZModel\Cover\nlcd_cover

Output raster:

C:\Data\ITD345\LZModel\Cover\cover_expand

Number of cells:

1

Zone values:

Value = 100

Con (2)

Parameters:

Input conditional raster:

C:\Data\ITD345\LZModel\Cover\nlcd_cover

Input true raster or constant value:

10

Output raster:

C:\Data\ITD345\LZModel\Cover\cover_class

Input false raster or constant value:

C:\Data\ITD345\LZModel\Cover\cover_expand

Expression:

Value = 100

Con (3)

Parameters:

Input conditional raster:

C:\Data\ITD345\LZModel\SCA\sca

Input true raster or constant value:

10

Output raster:

C:\Data\ITD345\LZModel\Cover\cover

Input false raster or constant value:

C:\Data\ITD345\LZModel\Cover\cover_class

Expression:

Value = 1

Human Impact Zone

The ITD Human Impact Zone tool was not used to generate the HIZ component grid. The HIZ layer was created interactively because there were several different input sources for human developed . Most were obtained from existing county parcel or structure point GIS layers. Human developed sites for Franklin County were generalized from a coarser land cover GIS layer.

<u>ITD District 5 Area of Interest HIZ</u>
Process Steps

1. Bannock County
   Use ban_build.shp from Kirk Mottishaw, Bannock County
   Select Use_Code <> '' and save as bannock structures.shp
   See bannock_data_readme.doc
   Run feature to point and save as bannock_struc_points.shp
   Assign Human-Developed Site category (HDS=high)

2. Bear Lake County
   Use bearlake.shp (parcels) from Zach Maillard, Idaho Department of Water Resources
   See idfg.doc (building categories and data file column headings) from Dale Thornock, Bear Lake County, Chief Deputy Assessor
   Use Bear Lake Assessor From Txt.xls (data file)
   Hand edited 376 records in assessor.txt that contained "&" as part of the data(data file used "&" as delimiter)
   Save as bearlake2.dbf and join to bearlake.shp: StateNo=PIN
   PIN numbers are not unique, some records with no PIN, and some duplicate polygons
   Select from Category1-Category10 with building category 30-46 and save as bearlake_bldgs.shp
   Run feature to point and save as bearlake_bldg_points.shp
   Assign Human-Developed Site category (HDS=high)

3. Caribou County
   Use structures_idfg.shp from Josse Allen, GIS Specialist, Caribou County
   See CaribouCo_readme.doc
   Save as caribou_struc_points.shp
   Assign Human-Developed Site category (HDS=high)

4. Oneida County
   Use April2407.shp (parcels) from Kathleen Atkinson, Deputy Assessor, Oneida County
   Select property improvement codes in PM_CATS from Property Category Numbers.xls
   Save as Oneida_structures.shp
   Run feature to point and save as oneida_bldg_points.shp
   Assign Human-Developed Site category (HDS=high)

5. Idaho Structures
   Use idahostructures.shp
   Select points in District 5 area of interest and save as aoi_idahostructures.shp
   Assign Human-Developed Site category (HDS=high/medium/low)

6. Recreation Sites
   Create rec_sites2.shp from BLM Surface Management Status maps: Malad City, Soda Springs, Preston, Pocatello and Caribou-Targhee National Forest maps: Montpelier & Soda Springs Ranger Districts and Westside Ranger District
   Digitize points that are not included in idahostructures.shp
   Assign Human-Developed Site category (HDS=high/medium/low)

7. Merge all point files in ITD District 5 area of interest: hds_d5aoi_points.shp

8. Generate human influence zones around human developed sites based on impact classification of low, med, or high.
   <u>Buffer</u>

Parameters:
Input features:
C:\Data\ITD345\HDS_data\ HDS_D5aoi_points.shp
Distance field:
BuffDist
Output feature class:
C:\Data\ITD345\HDS_data\ HDS_D5aoi_buffer.shp

9. Convert human influence zone polygons to raster.
<u>Feature to Raster</u>
Parameters:
Input features:
C:\Data\ITD345\HDS_data\ HDS_D5aoi_buffer.shp
Field:
Value
Output raster:
C:\Data\ITD345\HDS_data\ hds_grid
Output cell size:
30

10. Calculate distance from human influence zones
<u>Euclidean Distance</u>
Parameters:
Input raster or feature source data:
C:\Data\ITD345\HDS_data\ hds_grid
Output distance raster:
C:\Data\ITD345\HDS_data\eucdist_hds
Output cell size:
30

11. Classify data into high, med, and low impact zones
<u>Reclassify</u>
Parameters:
Input raster:
C:\Data\ITD345\HDS_data\eucdist_hds
Reclass field:
Value
Reclassification:
Remap:

0	to 100000
0 - 125	to 10000
125 – 245	to 1000
> 245	to 10

Output raster:
C:\Data\ITD345\HDS_data\points_hiz

Note: Due to the cell size and distance calculation method, the cell value of 125 was set as the break to select cells in the first impact band beyond the human influence zone to avoid under representing that zone by using 120 as the cutoff value. Similarly, 245 was used for the next impact zone cutoff.

<u>Franklin County HIZ</u>
Process Steps
1. Select human developed sites from NLCD
<u>Con</u>

Parameters:

Input conditional raster:

C:\Data\ITD345\LandCover\nlcd_d5

Input true raster or constant value:

1

Output raster:

C:\Data\ITD345\HDS_data\franklin_dev

Expression:

nlcd_d5 = 21 OR nlcd_d5 = 22 OR nlcd_d5 = 23

2. Calculate distance from closest human development

<u>Euclidean Distance</u>

Parameters:

Input raster or feature source data:

C:\Data\ITD345\HDS_data\franklin_dev

Output distance raster:

C:\Data\ITD345\HDS_data\eucdist_frank

Output cell size:

30

3. Classify data into high, med, and low impact zones

<u>Reclassify</u>

Parameters:

Input raster

C:\Data\ITD345\HDS_data\eucdist_frank

Reclass field

Value

Reclassification

Remap

0 - 215	to 100000
215 – 335	to 10000
335 – 460	to 1000
> 455	to 10
NODATA	to 10

Output raster

C:\Data\ITD345\HDS_data\franklin_hiz

Note: It was assumed that all human developed sites are high human influence zones, therefore the largest impact area or zone size was used to generate the high impact zone (100,000). This zone is the area within 210 meters from the developed site. Due to the cell size and distance calculation method, cell values of up to 215 were included in the first (high) impact zone to avoid under estimating the zone by using 210 as the cutoff value. Similar logic was used to classify the med and low impact zones which are defined as concentric bands extending 120 meters beyond the previous zone.

<u>HIZ</u>

1. Combine ITD District 5 HIZ and Franklin County HIZ

<u>Con</u>

Parameters:

Input raster:

C:\Data\ITD345\HDS_data\points_hiz

C:\Data\ITD345\HDS_data\franklin_hiz

Output raster:

C:\Data\ITD345\LZModel\HIZ\hiz

Expression:

```
hiz = con( franklin_hiz > points_hiz, franklin_hiz, points_hiz)
```

Riparian

NWI data was used to determine riparian areas, therefore the ITD Riparian model based on NHD streams and waterbodies was not used to create the riparian component.

Process Steps

1. Merge NWI data for ITD District 5

<u>Merge</u>

Parameters:

Input Datasets:

C:\Data\ITD345\NWI\Preston.shp
C:\Data\ITD345\NWI\Malad_City.shp
C:\Data\ITD345\NWI\Soda_Springs.shp
C:\Data\ITD345\NWI\Pocatello.shp
C:\Data\ITD345\NWI\Palisades.shp
C:\Data\ITD345\NWI\Blackfoot.shp

Output Dataset:

C:\Data\ITD345\NWI\NWI_D5aoi.shp

2. Select riparian polygons.

<u>Select by Attributes</u>

Expression:

SELECT * FROM NWI_D5aoi WHERE:
"ATTRIBUTE" = 'PSSA' OR "ATTRIBUTE" = 'PSSB' OR "ATTRIBUTE" = 'PSSC' OR
"ATTRIBUTE" = 'PUSA' OR "ATTRIBUTE" = 'PUBG' OR "ATTRIBUTE" = 'PUSC'

3. Convert selected polygons to raster

<u>Feature to Raster</u>

Parameters:

Input features:

C:\Data\ITD345\NWI\NWI_D5aoi.shp

Field:

Attribute

Output raster:

C:\Data\ITD345\NWI\nwi_rg1

Output cell size:

30

4. Assign model values, i.e. riparian cells = 1, all other = 10.

<u>Con</u> (Spatial Analyst Tools – Raster Calculator)

Parameters:

Input raster:

C:\Data\ITD345\NWI\nwi_rg1

Output raster:

C:\Data\ITD345\LZModel\RIPARIAN\nwi_riparian

Expression:

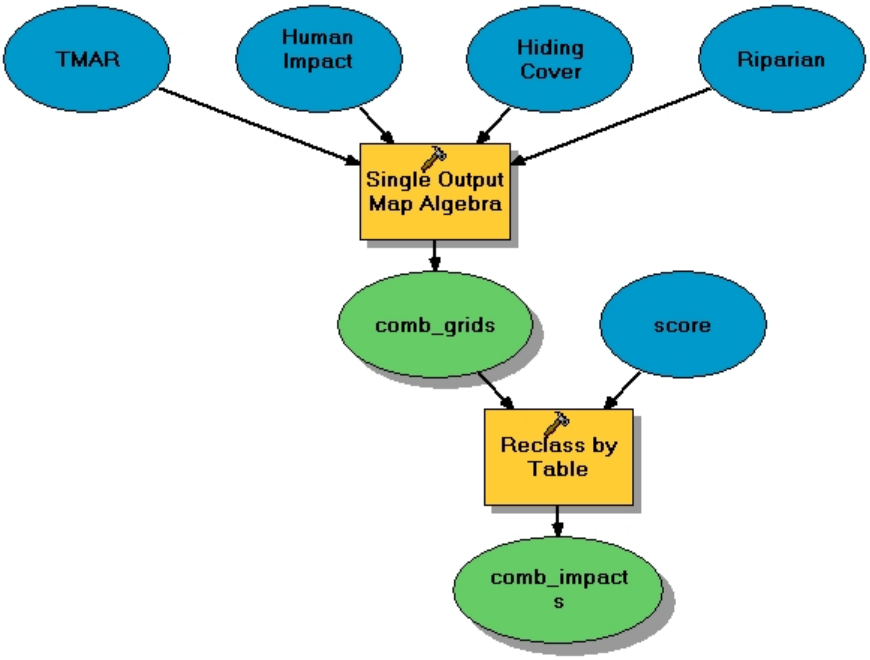
con (isnull(nwi_rg1) == 1, 10, 1)

Combined Impacts

LZ Combined Impacts

Data format: ArcToolBox Tool

Abstract: LZ Combined Impacts adds the impact values from the component models and classifies the resultant grid into impact categories of minimal (1), low (2), moderate (3), or high (4).



ISO and ESRI Metadata:

- Metadata Information
- Resource Identification Information
- Distribution Information

Metadata elements shown with blue text are defined in the International Organization for Standardization's (ISO) document 19115 *Geographic Information - Metadata.* Elements shown with green text are defined by ESRI and will be documented as extentions to the ISO 19115. Elements shown with a green asterisk (*) will be automatically updated by ArcCatalog.

Metadata Information

***Last update:** 20071008

Resource Identification Information:

Citation:

Title: LZ Combined Impacts

Party responsible for the resource:
Individual's name: Ken Wall
Organization's name: Geodata Services, Inc.
Contact's position:
Contact's role:

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Descriptive keywords:

Keywords: cover, TMAR, total motorized access routes, SCA, secure core areas, riparian, HIZ, human impact zone

Abstract:
LZ Combined Impacts adds the impact values from the component models and classifies the resultant grid into impact categories of minimal (1), low (2), moderate (3), or high (4).
MINIMAL: In general, to be considered in the “minimal” combined impact category, the pixel had to have “neutral” or beneficial” impact values for all 4 individual layers, or only one condition have a “minimal” or “low” impact value.

4 beneficial or neutral
3 beneficial or neutral and 1 minimal or low

LOW: To be considered in the “low” combined impact category, 2 conditions could be in the “minimal” or “low” category, or 1 condition in the “minimal” or “low” category and/or 1 condition in the “moderate” category while the others had to be “beneficial” or “neutral”.

2 minimal or low and 2 beneficial or neutral
1 minimal or low and 1 moderate and 2 beneficial or neutral
1 moderate and 3 beneficial or neutral

MODERATE OR HIGH: To be considered in the “moderate” or “high” combined impact category, the individual impact values had to be different combinations of “low”, “moderate”, and “high impact values.

Resource constraints:

Constraints:

Limitations of use:

Distribution Information:

Distributor:

Available format:

Format name: ArcToolBox Tool

Process Steps

1. Add model component grids.

Single Output Map Algebra

Parameters:

Input raster or feature data:

C:\Data\ITD345\LZModel\TMAR\tmar
C:\Data\ITD345\LZModel\HIZ\hiz
C:\Data\ITD345\LZModel\Cover\cover
C:\Data\ITD345\LZModel\Riparian\riparian

Map Algebra expression:

riparian + cover + hiz + tmar

Output raster:

C:\Data\ITD345\LZModel\comb_grids

2. Use lookup table to reclassify combined grid value into classes of high, med, or low impacts.

Reclass by Table

Parameters:

Input raster:

C:\Data\ITD345\LZModel\comb_grids

Input remap table:

C:\Data\ITD345\LZModel\score.dbf

From value field:

CIC#

To value field:

CIC#

Output value field:

code

Output raster:

C:\Data\ITD345\LZModel\comb_impacts

Remap table – score.dbf:

CIC#	code
22	1
31	1
40	1
112	1
121	1
130	1
211	2
220	2
1012	1
1021	1
1030	1
1102	2
1111	2
1120	2
1201	2
1210	2
2011	2
2020	2
2101	2
2110	3
10012	2
10021	2
10030	2

10102	2
10111	2
10120	2
10201	2
10210	3
11002	2
11011	2
11020	3
11101	3
11110	3
12001	3
12010	4
20002	3
20011	3
20020	3
20101	3
20110	4
21001	4
21010	4
30001	4
30010	4
100012	4
100021	4
100030	4
100102	4
100111	4
100120	4
100201	4
100210	4
101011	3
101020	4
101101	4
101110	4
110002	4
110011	4
110020	4
110101	4
110110	4
111001	4
111010	4
120001	4
120010	4