PART I - ADMINISTRATIVE

Section 1. General administrative information

Title of project

Integrating Okanogan And Methow Watershed Data For Salmonid Restoration

BPA project number: 20042
Contract renewal date (mm/yyyy): ☐ **Multiple actions?**

Business name of agency, institution or organization requesting funding
Okanogan Conservation District

Business acronym (if appropriate) OCD

Proposal contact person or principal investigator:

Name	Craig Nelson
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NPPC Program Measure Number(s) which this project addresses
The proposed project addresses the following sections of the 1994 FWP as ammended in1995: Section 7.6A1, 7.6C.2, and 7.7.

FWS/NMFS Biological Opinion Number(s) which this project addresses
The NMFW has not written any formal biological opinions in the project area though they have had informal dealings on Omak Creek, Salmon Creek, Early Winters Creek and elsewhere in the Okanogan and Methow watersheds.

Other planning document references
Support for the proposed project has been given by means of letters of recommendation for this proposal. Copies of these letters of recommendation were submitted with the hard-copy version of this proposal and are on file at the OCD. These letters of recommendation are cited in the subsequent reference section and include Colville Confederated Tribes (1998); Okanogan County (1998); Osoyoos Lake Water Quality

Society (1998); City of Omak (1998); City of Oroville (1998); City of Tonasket (1998); and Washington Department of Fish and Wildlife (1998).

Short description
Gather, compile, and integrate all relevant watershed, fisheries, and water-quality information into a pre-developed computerized information tool for dissemination to policy makers and stakeholders for use in watershed restoration planning and monitoring

Target species
Steelhead, Spring Chinook Salmon, Sockeye, Bull Trout, Redband Trout, Cutthroat Trout

Section 2. Sorting and evaluation

Subbasin
Upper Mid-Columbia

Evaluation Process Sort

CBFWA caucus	Special evaluation process	ISRP project type
Mark one or more caucus	If your project fits either of these processes, mark one or both	Mark one or more categories
☒ Anadromous fish ☒ Resident fish ☐ Wildlife	☒ Multi-year (milestone-based evaluation) ☐ Watershed project evaluation	☐ Watershed councils/model watersheds ☒ Information dissemination ☐ Operation & maintenance ☐ New construction ☐ Research & monitoring ☐ Implementation & management ☐ Wildlife habitat acquisitions

Section 3. Relationships to other Bonneville projects

Umbrella / sub-proposal relationships. List umbrella project first.

Project #	Project title/description

Other dependent or critically-related projects

Project #	Project title/description	Nature of relationship
9604200	Salmon Creek Anadromous Fisheries	Cooperative

	Restoration Project	

Section 4. Objectives, tasks and schedules

Past accomplishments

Year	Accomplishment	Met biological objectives?

Objectives and tasks

Obj 1,2,3	Objective	Task a,b,c	Task
1	Form Resource-Information Integration Committee	a	Form Resource-Information Integration Committee
1	Form Resource-Information Integration Committee	b	Prioritize subwatersheds
1	Form Resource-Information Integration Committee	c	Identify all possible data that could be included in KRIS tool
2	Gather and compile existing data	a	Acquire and process data
3	Prioritize and standardize data	a	Prioritize and standardize data
4	Interpret and explain information	a	Interpret and explain information
5	Customize KRIS tool for Okanogan/Methow users	a	Customize KRIS tool for Okanogan/Methow users
6	Disseminate resource information for watershed planning, restoration and monitoring	a	Provide demonstrations
6	Disseminate resource information for watershed planning, restoration and monitoring	b	Provide trainings
6	Disseminate resource information for watershed planning, restoration and monitoring	c	Incorporate final edits
6	Disseminate resource information for watershed planning, restoration and monitoring	d	Deliver final KRIS product
7	Advise RIIC on future management of KRIS tool	a	Deliver draft plan for long-term maintenance
7	Advise RIIC on future	b	Deliver final plan for long-term

	management of KRIS tool		maintenance

Objective schedules and costs

Obj #	Start date mm/yyyy	End date mm/yyyy	Measureable biological objective(s)	Milestone	FY2000 Cost %
1	10/1999	1/2000		X	5.00%
2	10/1999	2/2000		X	0.00%
3	10/1999	4/2000		X	3.00%
4	10/1999	11/2000		X	82.00%
5	10/1999	8/2001			10.00%
				Total	100.00%

Schedule constraints
Assumes a project start date of October 1, 1999. End dates for each objective will be based on actual start date as detailed in the methods.

Completion date
FY 2001

Section 5. Budget

FY99 project budget (BPA obligated):

FY2000 budget by line item

Item	Note	% of total	FY2000
Personnel		%8	22,755.00
Fringe benefits		%0	0
Supplies, materials, non-expendable property		%0	300.00
Operations & maintenance		%1	3,286
Capital acquisitions or improvements (e.g. land, buildings, major equip.)		%2	4,500.00
NEPA costs		%0	0
Construction-related support		%0	0.00
PIT tags	# of tags: 0	%0	0
Travel		%1	3,090.00
Indirect costs		%2	6,600
Subcontractor	Terraqua/Kier Associates	%85	$228,754.02
Other		%0	0.00

TOTAL BPA FY2000 BUDGET REQUEST	$269,285

Cost sharing

Organization	Item or service provided	% total project cost (incl. BPA)	Amount ($)
USF&WS	In-kind and GIS	%1	1,500
WDF&W	In-kind and GIS	%1	1,500
WDNR	In-kind and GIS	%1	1,500
Okanogan County	In-kind and GIS	%1	2,500.00
Colville Confederated Tribes	In-kind and GIS	%1	2,500
Total project cost (including BPA portion)			$278,785

Outyear costs

	FY2001	FY02	FY03	FY04
Total budget	$200,000	$0	$0	0

Section 6. References

Watershed?	Reference
☐	
☐	Colville Confederated Tribes. 1998. Letter to Craig Nelson, OCD, from Gary Passmore, Environmental Trust Department of the Colville Confederated Tribes, in support of OCD efforts to develop resource information management tools. Nespelem, Washington.
☐	Okanogan County. 1998. Letter to Craig Nelson, OCD, from Rusty Bonser, Okanogan County Planning and Development Department, in support of OCD efforts to develop resource information management tools. Okanogan, Wa.
☐	Osoyoos Lake Water Quality Society. 1998. Letter to Craig Nelson, OCD, from Lionel Dallas, OLWQS, in support of OCD efforts to develop resource information sharing tools. Osoyoos, British Columbia.
☐	City of Omak. 1998. Letter to Craig Nelson, OCD, from E. Walt Smith, Mayor of the City of Omak, in support of OCD efforts to develop resource information management tools. Omak, Wa.
☐	City of Oroville. 1998. Letter to Craig Nelson, OCD, from Jimmie Dale Walker, Mayor of the City of Tonasket, in support of OCD efforts to develop resource information management tools. Oroville, Wa.
☐	City of Tonasket. 1998. Letter to Craig Nelson, OCD, from David T. Caddy Sr., Mayor of the City of Tonasket, in support of OCD efforts to develop resource information management tools. Tonasket, Wa.
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☐	Washington Department of Fish and Wildlife. 1998. Letter to Craig Nelson, OCD, from Tracy Lloyd, Washington Department of Fish and Wildlife, in support of OCD efforts to develop resource information management tools. Ephrata, Wa.
☒	USFS (U.S. Forest Service). 1998a. Bonaparte Watershed Assessment. Tonasket Ranger District. Okanogan National Forest, Tonasket, WA.
☒	USFS (U.S. Forest Service). 1998b. Tonasket Watershed Assessment. Tonasket Ranger District. Okanogan National Forest, Tonasket, WA.
☒	CCT (Confederated Tribes of the Colville Indian Reservation). 1995a. Omak Creek Watershed Plan/Environmental Assessment. Nespelem, WA.
☒	WDNR (Washington State Department of Natural Resources). 1996. Loomis Forest Plan. WDNR. Olympia, Wa.
☒	USFS (U.S. Forest Service). 1997a. Salmon Creek Watershed Analysis. Okanogan National Forest, Okanogan, Wa.
☒	USFS (U.S. Forest Service). 1995a. Toats Coulee Watershed Analysis. Tonasket Ranger District. Okanogan National Forest, Tonasket, Wa.
☒	OCD (Okanogan Conservation District). In preparation. Okanogan Watershed Management Plan. Okanogan, Wa.
☒	Okanogan County. 1996. Multi-Objective River Corridor Plan for the Methow Basin. Office of Planning and Development, Okanogan, WA.
☐	NPPC (Northwest Power Planning Council). 1994. Columbia River Basin Fish and Wildlife Program. NPPC, Portland, Or.
☐	ISRP (Independent Scientific Review Panel). 1998. Review of the Columbia River Basin Fish and Wildlife Program for Fiscal Year 1999 as Directed by the 1996 Amendment to the Northwest Power Act. ISRP 98-1.
☒	USFS (U.S. Forest Service). 1994. Chewuch River Watershed Analysis. Winthrop Ranger District. Okanogan National Forest, Winthrop, WA.
☒	USFS (U.S. Forest Service). 1995b. Twisp River Watershed Analysis. Methow Valley Ranger District. Okanogan National Forest, Twisp, WA.
☒	MVWPPP (Methow Valley Water Pilot Planning Project). 1994. Methow River Basin Plan. Planning Committee, Twisp, WA.
☒	MVGWAC (Methow Valley Ground Water Advisory Committee). 1994. Methow Valley Ground Water Management Plan, Twisp, WA.
☒	USFS (U.S. Forest Service). 1997b. Middle Methow Watershed Analysis. Methow Valley Ranger District. Okanogan National Forest, Twisp, WA.
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PART II - NARRATIVE

Section 7. Abstract

Planning, implementation, and monitoring of watershed restoration projects, and decision-making regarding the efficacy of these projects, has been frustrated due to the lack of integration of the data and information, and the inability for policy makers, restoration experts, and the general public to easily access existing information. This project will produce a watershed, fisheries, and water-quality database system known as KRIS/Okanogan-Methow that allows easy access to data sets, charts and graphs, photographs and other images, maps and GIS layers, and bibliographic resources through a tab-driven system that is highly user-friendly. Virtually all of the goals pertaining to watershed and fishery restoration within subbasins, such as the Okanogan and Methow, that are embodied within the FWP, will be facilitated by the proposed KRIS/Okanogan-Methow tool. These goals will be met because all relevant watershed and fishery restoration information directly affecting the project area that has ever been collected by FWP-sponsored projects or studies, as well as that information collected by studies or projects sponsored by any other public agency or participating stakeholder group, will be assessed and prioritized. The best information from this large body, as determined by experts from leading restoration groups and institutions in the project area, will be assimilated into the KRIS tool. This tool will be delivered in the form of 500 CD-ROM's, on the Internet, and through demonstrations, trainings, and a report describing the tool's long-term use and management. This information tool will be completed by September 30, 2001, provided that the project initiation is October 1, 1999.

Section 8. Project description

a. Technical and/or scientific background

Vast amounts of time and money have been allocated to the research and assessment of watershed, fisheries, and water-quality conditions within the Okanogan and Methow river watersheds. Many studies and reports, including as many as twelve formal watershed assessments, have been written describing these conditions (e.g. OCD In preparation; CCT 1995a, 1995b; USFS 1994, 1995a, 1995b, 1997a, 1997b, 1998a, 1998b; WDNR 1996; MVWPPP 1994; MVGWAC 1994; Okanogan County 1996). However, planning, implementation and monitoring of watershed restoration projects, and decision-making regarding the efficacy of these projects, has been stymied due to 1) the lack of integration of the data and information compiled by these studies and reports, and 2) the inability for policy makers, watershed restoration experts, and the general public to easily access this information in a useable format.

In addition to frustrating watershed-restoration decision making and planning, the disorganized nature of watershed, fisheries, and water-quality information has critically hindered efforts to convince the general public that 1) these efforts have a measurable chance of succeeding in their goals, 2) restoration programs are worthy of participation, and 3) restoration programs are worthy of future funding. Indeed, unless resource information from previous and existing restoration and assessment programs is organized into a useful fashion, watershed restoration programs may collapse under their own weight.

Furthermore, the current disorganized nature of watershed, fisheries, and water-quality information prevents effective monitoring of any current or proposed watershed restoration

projects. Without a framework for collecting, analyzing, and disseminating monitoring information, comparisons within and among sub-basins, and between pre-project and post-project conditions, will lack a grounded frame of reference necessary to provide useful understanding of the project's worth and efficacy.

This situation has been recognized by the Columbia River Basin Fish and Wildlife Program (FWP), which identified the need that all human activities affecting production of salmon and steelhead are coordinated on a comprehensive watershed management basis (NPPC 1994; Habitat Goal 7.6A.1). The FWP (NPPC 1994, Section 7.6C.2) also called for a comprehensive program, involving coordination of data collection, analysis, and reporting, to monitor progress in achieving compliance with the Council's habitat objectives. Section 7.7 of the FWP calls for cooperative habitat protection and improvement with private landowners; a goal that is unlikely to be met unless program goals and objectives, watershed information, restoration project information, and frameworks for restoration monitoring can be easily shared between the local, state, federal, and tribal participants in watershed restoration. In the Okanogan and Methow watersheds, these FWP goals have not yet been met.

Moreover, the ISRP (1998) made clear that in order to implement the goals of the FWP, comprehensive assessments of watersheds need to be performed. The ISRP (1998) has identified deficiencies in many proposals to the FWP that would be ameliorated if watershed, fisheries, and water-quality information was integrated and easily accessible to proposers. For instance, habitat restoration proposals have suffered from the lack of basic information such as "the distribution of the species of interest," "how the proposal relates to other restoration efforts within the watershed," and "what evidence suggests that the proposed activity would actually correct a significant limiting factor" (ISRP 1998, page 93). Proposals for information dissemination have failed by not specifying what is "the mechanism for assuring quality control over the information/data being given to the public" and whether "the data are reasonably current and in a form that can be easily viewed and downloaded"

Finally, state laws being implemented in the Okanogan and Methow watersheds mandate programs that would benefit from the kind of resource-information management system that is presently being proposed. For instance, H.B. 2496, "Salmon Recovery," calls for "a limiting factor analysis;" the Methow River has been selected as a primary target area for this effort. H.B. 2514, "Water Resource Planning," mandated watershed planning that is being initiated by Okanogan County in the Methow River.

The proposed project will apply a proven tool, the Klamath Resource Information System (KRIS), to integrate all relevant and prioritized watershed, fisheries, and water-quality information in the Okanogan and Methow river watersheds of North Central Washington and southern British Columbia. The integrated information will then be disseminated to all groups cooperating in watershed restoration from within these two basins including interested landowners and stakeholder groups, and Federal, State, Tribal, and Provincial agencies.

KRIS is a watershed, fisheries, and water-quality database management system which was developed by the project team to support a large salmon watershed restoration program in northern California. This custom program, developed with Borland's Delphi© tools, allows easy access to data sets, charts and graphs, photographs and satellite images, maps and GIS layers, and bibliographic resources through a tab-driven system that is highly user-friendly. KRIS also has special features that allow less sophisticated computer users to integrate new data and easily make new charts and graphs, enter photographs or images, and pull in new GIS layers. Upgrades to KRIS during this project will also allow users to access, import, and display information in KRIS that is available on the Internet from existing Columbia Basin content-providers such as StreamNet. KRIS' data, charts, images, and maps can be cut and pasted into reports, or can be

shared with other computer programs. KRIS is, therefore, an ideal tool for landowners, grassroots watershed restoration groups, policy makers, agency employees, scientists, and students to use as a shared monitoring system.

b. Rationale and significance to Regional Programs

Virtually all of the goals pertaining to watershed and fisheries restoration within subbasins such as the Okanogan and Methow watersheds, that are embodied within the FWP will be facilitated by the proposed KRIS/Okanogan-Methow tool. This bold claim is supported by the fact that all relevant watershed and fishery restoration information directly affecting the project area that has ever been collected by FWP-sponsored projects or studies, as well as that information collected by studies or projects sponsored by any other public agency or participating stakeholder group, will be assessed and prioritized. The best information from this large body, as determined by watershed and fishery experts from leading restoration groups and institutions (in the form of the proposed Resource-Information Integration Committee), will be compiled and assimilated into the KRIS/Okanogan-Methow tool. In the case where no existing information is available that address FWP goals or objectives pertaining to restoration within the project area, the KRIS tool will be useful in conveying the FWP goals and will be structured to assimilate future data collected in pursuit of those goals.

Specific FWP measures addressed by this proposal include Section 7.6A1, 7.6C.2, and 7.7 of the 1994 FWP as amended in1995. The need for a framework for collecting, analyzing, and disseminating monitoring information, for comparisons within and among sub-basins, and for comparisons between pre-project and post-project conditions, has been recognized by the FWP, which identified the need that all human activities affecting production of salmon and steelhead are coordinated on a comprehensive watershed management basis (NPPC 1994; Habitat Goal 7.6A.1). The FWP (NPPC 1994, Section 7.6C.2) also called for a comprehensive program, involving coordination of data collection, analysis, and reporting, to monitor progress in achieving compliance with the Council's habitat objectives. Section 7.7 of the FWP calls for cooperative habitat protection and improvement with private landowners; a goal that is unlikely to be met unless program goals and objectives, watershed information, restoration project information, and frameworks for restoration monitoring can be easily shared between the local, state, federal, and tribal participants in watershed restoration. In the Okanogan and Methow watersheds, these FWP goals have not yet been met.

c. Relationships to other projects

Salmon Creek Anadromous Fisheries Restoration Project – This project goal is to assess the feasibility for restoring anadromous fisheries to the Salmon Creek drainage (a sub-watershed of the Okanogan River). This project will assist landowners in the basin to identify ways in which restoration of their lands can be beneficial to the environment and not be a financial burden to them. Information developed under the Salmon Creek project will be included in the KRIS tool. Information compiled and disseminated in KRIS will facilitate possible future restoration actions in Salmon Creek.

Okanogan Watershed Management Plan (OWMP) - Both the Stakeholders Advisory Committee and Technical Advisory Committee, established under the OWMP, have identified information sharing as a critical step in protecting water quality and monitoring restoration efforts. Both committees have requested that the proposed project be developed to facilitate information sharing in the Okanogan River Basin and have listed this project as a necessary action item for

managing water quality in the Okanogan Basin. Information developed under the OWMP will be included in the proposed database, and information compiled and disseminated as a result of the proposed project will be directly useful in the implementation of the OWMP and will be used for the evaluation of measures resulting from the OWMP.

Omak Creek PL-566 Implementation - The product developed with this proposal will facilitate the transfer of knowledge and experience of watershed restoration efforts and increase the effectiveness of implementation efforts in Omak Creek.

StreamNet – StreamNet is an on-line database designed to share resource information with users throughout the Columbia River Basin. It is very effective at disseminating region-wide information. However, because of its large geographical scope, it often covers subbasins with coarse resolution and can be deficient in detailed information directly relevant to watershed restoration. The KRIS tool complements StreamNet by providing an updateable, user-friendly, and locally operated source of information that addresses the fine scale resolution necessary to design, implement, and monitor watershed restoration efforts.

d. **Project history** (for ongoing projects)

Though the project proponents have developed similar projects in other watersheds (including the Klamath River, Ca.; Trinity River, Ca.; Battle Creek, Ca.; and 33 small California coastal watersheds; and is partially funded to develop a similar project in the Chehalis River Basin, Wa.) the proposed project is new to the Columbia Basin and thus, has no formal history with BPA.

The KRIS tool was demonstrated to staff members of BPA (including: Lori Bodi, Paddy McGuire, Mark Shaw, David Byrnes and others), NPPC (including: Erik Merrill, Mark Fritsch, Karl Weist, John Marsh, André L'Heureux and others), CBFWA (Brian Allee, Diana MacDonald, Tom Clune), and Lower Columbia River Estuary Program (Bill Young and Nate Alexander) on October 26, 1998.

The KRIS tool has also been demonstrated to many stakeholders in the Okanogan/Methow watersheds. The OCD's efforts to build an information sharing tool, and specifically, this proposal, have received support in the form of letters of recommendation from the following organizations: Confederated Tribes of the Colville Indian Reservation; Okanogan County; Lake Osoyoos Water Quality Society; City of Omak; City of Oroville; Town of Tonasket; and Washington Department of Fish and Wildlife.

e. Proposal objectives

1) Form a Resource-Information Integration Committee (RIIC) in the Okanogan and Methow river watersheds. This committee will facilitate information sharing and planning coordination, and will also oversee the development of the KRIS Okanogan/Methow information sharing tool. The RIIC will be comprised of representatives from all groups cooperating in watershed restoration from within these two sub-basins including interested landowners and stakeholder groups, and Federal, State, Tribal, and Provincial agencies. Likely participants would include, but would not be limited to, departments of the Colville Confederated Tribes (CCT), departments of the Yakama Tribe, Okanogan Conservation District (OCD), Okanogan County, Washington Department of Fish and Wildlife (WDFW), Washington Department of Ecology (WDOE), Washington Department of Natural Resources (WDNR), Natural Resource Conservation Service (NRCS), U.S. Forest Service (USFS), U.S. Bureau of Land Management (BLM), U.S. Fish and Wildlife Service (USFWS), British

Columbia Ministry of the Environment Lands and Parks (BCMELP), Lake Osoyoos Water Quality Society, local landowner organizations, and local watershed restoration groups.

The formation of the RIIC will be facilitated by the OCD. This committee will be open to any person or group interested in the facilitation of watershed-restoration and the integration of natural resource data, or any person or group in possession of relevant information. This RIIC will also be a forum to help sub-basin stakeholders work more closely in the future, through the joint use and maintenance of the completed KRIS/Okanogan-Methow tool.

2) Gather and compile existing watershed, fisheries, and water-quality information. The KRIS development team, working under the guidance of the Resource-Information Integration Committee (RIIC), will identify all existing relevant information pertaining to watershed restoration and planning, fisheries, and water-quality. All relevant information will include numerical data sets, charts and graphs, photographs and satellite images, maps and GIS layers, and bibliographic resources. Sources of numerical data will include published and unpublished state, tribal, federal, and provincial research, monitoring, and restoration-project studies, reports, and files. For example, the CCT currently maintain over 120 water quality monitoring stations on reservation streams, which measure several aspects of water quality; data from those stations within the project area will be included in the KRIS tool. Numerical data, developed by other stakeholders and accepted by the RIIC, will also be included. Charts and graphs will be obtained either from existing reports or will be developed, as part of the KRIS project, from numerical data collected from the above sources. Photographs of watershed conditions, including ongoing photo-point documentation of watershed restoration projects, will come from established governmental repositories, participating restoration organizations and agencies, landowners, and libraries such as the Okanogan County Historical Museum. Maps and GIS data will be obtained from cooperating agencies and institutions who will likely be represented on the RIIC. For example, Okanogan County maintains a GIS data base that could serve as the foundation for GIS development within the KRIS tool. Bibliographic references will primarily be obtained from the same reports that provided numerical data as well as regional summaries and planning documents. For example, the Okanogan Watershed Management Plan being finalized in 1999 includes an extensive bibliography. Original documents cited in this plan may be included in KRIS. Relevant scientific literature from journals and agency research divisions may also be included. Finally, documents pertaining to the general fields of fisheries and watershed restoration, incorporated in previous KRIS tools developed in other watershed, can be easily brought into the proposed KRIS/Okanogan-Methow tool.

   The development of KRIS/Okanogan-Methow is restricted to existing scientifically-sound data. No new data will be collected for this project though the KRIS tool will, of course, be structured to accept new data in the future.

3) Prioritize and standardize watershed, fisheries, and water-quality information. Information gathered by the KRIS team will be organized by sub-watershed within the greater Okanogan and Methow watersheds. Some sub-watersheds may have relatively sparse data coverage. Others may have data coverage so extensive that it is not practical to include it all. The KRIS team will consult with the RIIC in determining which data elements to include and which to defer. The prioritization of data will be based on scientific merit, relevance to watershed and fisheries restoration, and importance to current and future planning and policy decisions. Data not included within the two-year development of the KRIS tool can always be included by future users of the KRIS tool

   Data to be included within the KRIS tool will come from a variety of sources and will exist in many formats. The KRIS team will convert this data to a single database format for inclusion

within KRIS. This format will allow for subsequent use within KRIS as well as export from KRIS to other programs. Charts and graphs will be made using standardized formats used in scientific forums and formats that have been demonstrated in other KRIS projects to be effective at communicating numerical data to users of all skill levels. Photographs and other images will be stored as TIF files and GIS vector layers will be converted to the ESRI shape format. Grid layers will be converted to both ESRI Arc/Info grid format and to GeoTiff format for easy display by simple viewing software such as the ArcExplorer program, which will be packaged free with KRIS.

4) Interpret and explain watershed, fisheries, and water-quality information. The KRIS tool is designed, and has been demonstrated through previous KRIS projects, to easily convey often-times complicated, natural resource information to users of all skill levels, from research scientists and technicians to landowners, policy makers, and students. In order to achieve this goal, the KRIS development team, which has many years of interpretive experience, employs several tiers of interpretation and explanation within the KRIS tool. On the broadest scale, the KRIS tool uses general textual summaries of broad topic areas supported by maps and photos to convey information such as species life history, watershed geology, or policy frameworks. For each topic within KRIS, including numerical data bases, photos, or charts, a caption is included that contains descriptions of the topic's contents and its meaning. These captions are often based on findings in the original report or document but are reworded to make sense to all readers. More detailed information about each topic is included in a textual format called "Info Links." These customized summaries build upon information in the caption to give each topic more relevance within the watershed context. In addition, metadata tables are linked to each topic. Metadata includes specifics about how, who, when, where, and why data was collected and where the original data was obtained. Finally, bibliographic references are included that allow users to learn about the studies and programs which collected the data and how the original study authors interpreted the data displayed in KRIS.

5) Customize the KRIS tool to serve the watershed monitoring needs of the Okanogan and Methow watersheds. KRIS is not only a library tool to exhibit old data. In fact, its primary usefulness is as a platform for the effective collection, storage, and analysis of future data to be collected in watershed monitoring programs. As pointed out in the FWP (NPPC 1994), monitoring information is only useful if it is collected and analyzed in a way that allows for standardized comparisons. Presently, resource data is collected in a variety of standards. The KRIS development team and the RIIC will establish standard formats for the display and analysis of useful monitoring information. In cases where more than one standard is needed, KRIS will be designed to show data in multiple formats.

   The KRIS tool will be further customized so that the exact contents of the KRIS tool can be published on the Internet in a way that allows for the dynamic creation of new web pages as new information is brought on-line. Furthermore, KRIS will be developed so that information from existing Columbia Basin content-providers, such as StreamNet, can be easily downloaded and displayed using the KRIS tool.

6) Disseminate natural resource information necessary for watershed planning, restoration, and monitoring. The easiest and fastest way for users to access the voluminous information compiled in a typical KRIS program is by including the data and program on a CD-ROM disk. Therefore, KRIS will be distributed to all interested users, by the OCD, in the CD-ROM format at the completion of the project. However, we will respond to increasing demand for on-line data by developing the capability for the exact contents of the KRIS tool to be published on the Internet in a way that allows for the dynamic creation of new web pages as new information is brought on-line. Furthermore, KRIS will be developed so that

information from existing Columbia Basin content-providers, such as StreamNet, can be easily downloaded and displayed using the KRIS tool.

The KRIS development team makes frequent presentations to professional meetings and watershed-interest gatherings. KRIS was featured at the 1997 annual meeting of the American Fisheries Society and has been featured in *ARC News*, a magazine widely read by natural resources managers concerned with information management. The KRIS development team will continue this record by making KRIS/Okanogan-Methow available at national and regional forums.

The OCD and the KRIS development team will conduct demonstrations and training sessions for the anticipated users of KRIS within the Okanogan and Methow watersheds. Users will be trained in all aspects of the use of KRIS. Users will be shown how to access data from the KRIS tool and how to add new watershed data.

Perhaps the most important way to insure the dissemination of information within the KRIS tool will be the inclusion of likely users (e.g. agency representatives and other stakeholders) in the design and construction of KRIS through participation in the RIIC. As demonstrated in previous KRIS projects, if the end user is involved in deciding which information is included in KRIS, how that information is displayed, and how KRIS is structured for storage and display of future data, then those users will be the ones most able and willing to use KRIS to its fullest extent. Therefore, the information gathering and dissemination aspects will be integrally linked throughout the project development so that final product dissemination will be maximized.

7) Advise the RIIC on ways to manage KRIS into the future. The KRIS development team will deliver a plan for the long-term use and maintenance of KRIS/Okanogan-Methow to the RIIC. This will include recommendations for the collection and assimilation of future data as well as recommendations for web hosting and maintenance of the internet version of KRIS.

f. Methods

SCOPE OF WORK

This project will produce a watershed, fisheries, and water-quality database management system known as KRIS/Okanogan-Methow. This custom program, developed with Borland's Delphi© tools, will allow easy access to data sets, charts and graphs, photographs and other images, maps and GIS layers, and bibliographic resources through a tab-driven system that is highly user-friendly. The existing KRIS software, developed by Kier Associates of Sausalito, California, will be upgraded during this project to allow users to access, import, and display information in KRIS that is available on the Internet from existing Columbia Basin content-providers such as StreamNet. The KRIS software will also be upgraded so that the entire contents of KRIS/Okanogan-Methow can be provided at a web site after the completion of the project.

The specific information items that will be included in the final KRIS/Okanogan-Methow tool will be determined through a scoping process involving the development and proceedings of a Resource-Information Integration Committee (RIIC) made up of representatives from all groups cooperating in watershed restoration from within these two sub-basins including interested landowners and stakeholder groups, and Federal, State, Tribal, and Provincial agencies.

The project will be limited to the Okanogan and Methow watersheds, including those portions of these watersheds that are located within British Columbia. The types of data that may be assimilated into KRIS include, but are not limited to, information about water temperature, water quality, stream flow, climate, fisheries abundance and distribution, fish run-timing, sensitive

aquatic species, fish habitat types including WDNR and USFS stream habitat typing, riparian vegetation, channel morphology, gravel quality, landslide and slope processes, road densities, upland vegetation types, soils, land use, wildfires, timber harvest, agriculture and irrigation, mining, topography, photographs of watershed restoration, photographs of current and historic watershed and riparian conditions, photographs of activities related to fisheries or fisheries restoration, and photographs of other historical value. Existing GIS basemaps and layers associated with any of these types of information will also be included.

This proposed project will assimilate only existing information. The information that is assimilated will be of high scientific value and of high priority to watershed restoration, as determined by the proposed Resource-Information Integration Committee (RIIC). No new data will be collected, no new GIS layers will be created, and no new photographs will be taken. However, the KRIS project will create treatments of existing data and will provide additional attributes to existing GIS layers to link the GIS components to information in the KRIS database.

Individual information elements are organized within the KRIS tool by topic. Each topic can be a photographic slide tour, chart or graph, or map layer, supported with captions, "info links," and metadata. The KRIS/Okanogan-Methow project will deliver at least 400 topics pertaining to the Okanogan and Methow watersheds. At least 1000 photographs or other images depicting watershed restoration projects, current and historic watershed and riparian conditions, activities related to fisheries or fisheries restoration, and photographs of other historical value will be included in KRIS/Okanogan-Methow. At least 20 GIS layers pertaining to the Okanogan and Methow watersheds will be included. The KRIS tool explains broad concepts by the use of "web pages" which convey general information such as species life history, watershed geology, or policy frameworks. At least 100 of these "web pages" will be included in KRIS/Okanogan-Methow. At least 6,000 pages of bibliographic references will be electronically assimilated into the KRIS/Okanogan-Methow tool (experience in other watersheds indicate that 6,000 pages is roughly 70 documents). Training in the use of the draft KRIS/Okanogan-Methow, including editing the draft content, will be offered to no fewer than 6 representatives from landowner, stakeholder, agency, and restoration community organizations within the project area. A total of 500 CD-ROMs with complete copies of the KRIS/Okanogan-Methow tool will be delivered to the RIIC. A complete copy of the entire contents of the KRIS/Okanogan-Methow tool will be installed on the Internet. A plan will be delivered to the RIIC suggesting strategies for the long-term use and management of the KRIS/Okanogan-Methow tool.

TASKS BY OBJECTIVE

1.A. Form a Resource-Information Integration Committee (RIIC) from among the project-area's experts in watershed and fisheries restoration including representatives from landowner and stakeholder groups, and Federal, Tribal, State, and Provincial agencies. Consult with the RIIC to identify the information available to guide watershed and fisheries evaluation, restoration, and monitoring. Report findings to the RIIC within 75 days of project initiation.

1.B. With guidance from the RIIC, prioritize the subwatersheds within the project area, for purposes of KRIS/Okanogan-Methow's development, presumably on the basis of greatest potential for restoration and greatest threat to the species of concern. Task to be accomplished within 90 days of project initiation.

1.C. With guidance from the RIIC, identify possible information elements for inclusion within KRIS/Okanogan-Methow. Task to be completed within 120 days of project initiation.

2.A. Maintain a close working relationship with the basin landowner and stakeholder, agency, Tribal, school, and restoration community in the acquisition and processing of the information elements identified in task 1.C. To be continued throughout the remainder of the project.

3.A. On the basis of the task 1.A., task 1.B., and task 1.C. consultations, and the data acquisition of task 2.A., reach agreement with the RIIC on the detailed list of information elements, including water quality datasets, fish habitat analyses, fish counts, fish harvest data, geology, land use and vegetative condition, restoration-related photographs and satellite images, and bibliographic resources for each subwatershed or group of subwatersheds, to be incorporated in KRIS/Okanogan-Methow. To be completed within 180 days of project initiation.

4.A. Assimilate prioritized information (Objective 3), including interpretation and explanation of prioritized information (Objective 4), into a draft KRIS/Okanogan-Methow tool and deliver draft to RIIC. To be completed within 405 days of project initiation.

5.A. Customize the KRIS tool through new computer programming and development to allow for the entire content of the KRIS/Okanogan-Methow to be accessible on the Internet. Customize the KRIS tool through new computer programming and development so that information from existing Columbia Basin content-providers, such as StreamNet, can be easily downloaded and displayed using the KRIS tool. To be completed 670 days after project initiation.

6.A. Provide demonstrations in the use of the draft KRIS/Okanogan-Methow, to landowner, stakeholder, agency, and restoration community members within the project area. To be completed within 450 days of project initiation.

6.B. Provide training in the use of the draft KRIS/Okanogan-Methow, including editing the draft content, to no fewer than 6 representatives from landowner, stakeholder, agency, and restoration community organizations within the project area. To be completed within 450 days of project initiation.

6.C. Incorporate final edits, including those received from the user community, into a final KRIS/Okanogan-Methow tool suitable for copying. To be completed within 670 days of project initiation.

6.D. Deliver 500 copies of the final KRIS/Okanogan-Methow tool on CD-ROM, to the RIIC. To be completed within 700 days of project initiation.

7.A. Deliver draft plan for KRIS/Okanogan-Methow's long-term use and maintenance, including recommendations for making the maintaining the system on the Internet, to the RIIC for its review. To be completed within 640 days of project initiation.

7.B. Deliver final plan for KRIS/Chehalis' long-term use and management to the RIIC. To be completed within 700 days of project initiation.

CRITICAL ASSUMPTIONS

This project hinges on two critical assumptions. This project assumes that representatives from groups cooperating in watershed restoration from within the project area including interested landowners and stakeholder groups, and Federal, State, Tribal, and Provincial, agencies will be willing to participate in advising project proponents in the gathering and assimilation of watershed information into an electronic information tool. However, preliminary scoping of the existing cooperators in the watershed indicates that there is a widespread recognition of the need and a broad level of support for this project.

The second assumption is that a large body of watershed, fisheries and water-quality information exists within the Okanogan and Methow watersheds. Fortunately, preliminary scoping, as

indicated by our partial list of references, shows that sufficient information and numerous watershed assessments currently exist.

KINDS OF RESULTS EXPECTED

This project is expected to deliver a watershed, fisheries, and water-quality database management system known as KRIS/Okanogan-Methow that will allow easy access to all relevant data sets, charts and graphs, photographs and other images, maps and GIS layers, and bibliographic resources through a tab-driven system that is highly user-friendly.

FACTORS THAY MAY LIMIT OUR SUCCESS

Our success may be limited depending on the willingness for basin resource agencies, Tribes, and other stakeholders to share existing information. However, as many organizations responsible for fisheries and watershed restoration have already been contacted and currently support this project, this concern is minimal. Our success may also be limited if existing information is in extremely poor, or disorganized, formats. Because we rely on existing information, our success is linked to the quality of existing information. However, we have had many years of experience developing the same tool in other watersheds. Our budget accommodates the reasonable likelihood that some disorganized data will need to be standardized.

g. Facilities and equipment

The KRIS development team will provide most significant facilities and equipment. However, in addition to computer equipment that we already own, we will need to purchase the following items:

1 laptop computer
1 writeable CD-ROM

The laptop computer will be used for public demonstrations and training associated with the development and dissemination of the KRIS tool. This item, in conjunction with a computer projector, will make possible the display of the KRIS program to large and small groups of people. Public demonstrations are perhaps the best way to garner active support among stakeholders and landowners for the development of not only KRIS, but watershed restoration projects in general. The writeable CD-ROM will be used by the OCD for publishing interim, final, and future versions of the KRIS program. This tool will make possible the long-term management of the KRIS/Okanogan-Methow tool after project completion

h. Budget

Personnel

This budget item includes funding for two 0.25 FTEs. The budget for this item was developed as follows:

Project Coordinator - The person in this position will coordinate and oversee the development of the database through meetings between the sub-contractor and an established Resource-Information Integration Committee.

$23.14/hr. composite rate (This includes social security, labor and industries, unemployment, medical benefits, and retirement contribution)
X 520 hrs. per year (0.25 FTE)

$12,032.80

Project Administrator - The person in this position will assist the project coordinator as necessary, complete vouchers, and provide clerical services as needed.

$20.62/hr. composite rate (This includes social security, labor and industries, unemployment, medical benefits, and retirement contribution)
X 520 hrs. per year (0.25 FTE)
$10,722.40

Supplies

There will be a minimal amount of supplies necessary for this project. The following is the budget for necessary supplies.

Office Supplies - This will include pens, pencils, paper, and associated necessary supplies to administer and coordinate this project. The amount budgeted for this is $100.00.

Blank writeable CD-ROMs - The CD-ROMs are necessary to distribute the draft versions of the product to the Technical Advisory Committee. The amount budgeted for this is $200.00

Operations & Maintenance

The following is a breakdown of the necessary services and equipment required to implement this project.

Office Rent - This is the rental of office space at a projected rate of $17.00/sq. ft. multiplied by 200 square feet per each of 2 employees. This is then multiplied by 0.25 (0.25 FTEs). The total is $850.00.

Telephone - This is to pay for the cost of a local telephone line and long distance charges. The budgeted cost is derived from $75.00 per month times 12 months. The budget for this item is $900.00.

Copies - Copies of documents (data for inclusion in a database) and voucher information will be necessary. The budget for this item is derived by multiplying 500 copies (10 cents each) per month by 12 months. The budget for this item is $600.00.

Postage - Mailings to Technical Advisory Committee members and requests for information will be charged at 100 mailings (33 cents [estimated new rate as of 1/1/99] each) times 12 months. Additionally, approximately 15 mailings a month of larger packages will be mailed ($3.00 each) times 12 months. The combined total is $936.00

Capital Acquisitions

The following is a breakdown of the necessary products and equipment required to implement this project.

Laptop Computer - The project administrator will need a laptop computer with necessary software applications to assist in the acquisition of data and presenting the project to area groups and organizations. This item is budgeted at $4,000.00

Compact Disk Writer - This is required to assist the project coordinator to store large amounts of data during the acquisition phase, and produce copies of the draft product during the review and implementation phases. This item is budgeted at $500.00.

Travel

The following is a breakdown of travel costs required to implement this project.

Mileage - Driving costs of $0.315 per mile times 500 miles per month will be necessary to meet with the Technical Advisory Group and assist in the acquisition of data. This is budgeted at $1,890.00.

Per Diem & Lodging - It is expected that during this project the coordinator may need to travel outside of the area to collect data from various agencies. This is calculated at $100.00/per day times 1 day per month. This item's budget is $1,200.00.

Indirect Costs

Insurance - This is the projects share of district insurance. The budget is derived from $150.00 per month times 12 months. The total budget for this item is $1,800.00.

Memberships - The Okanogan Conservation District is subject to membership fees in both the Washington Association of Conservation Districts and the National Association of Conservation Districts. The budget for this item is $400.00 per month for 12 months. The total is $4,800.00.

Section 9. Key personnel

Name	Project Title	Hours in FY2000	Hours in FY2001
Craig Nelson	Contract Administrator	0.25 FTE	0.25 FTE
Michael Ward	Project Manager	724	703
William Kier	Policy Analyst	52	72

Pat Higgins	Information Analyst	124	144
Dr. Jan Derksen	Database Designer/ GIS Coordinator	560	484

Craig T. Nelson
P.O. Box 92
Okanogan, WA 98840
(509) 422-1337

Education:

Central Washington University. Bachelor of Arts in Geography, minor in Environmental Studies. August, 1995

Experience:

District Manager

Okanogan Conservation District. December 2, 1996 – Present. Duties include: scheduling and coordinating Stakeholders Advisory Committee and Technical Advisory Committee meetings; composing and editing Okanogan Watershed Management Plan; developing local GIS database; public presentations to service groups and school children; water quality monitoring; completing stream restoration work such as willow plantings, grade stabilization structures, and sediment ponds; developing successful grants; developed new plant sale brochure; created and developed district newsletter; created and updates district internet homepage; developed fair booth.

District Technician

Kittitas County Conservation District. February 14, 1996 - November 30, 1996. Duties included: digitizing, editing, and proofing tract and field boundaries of study area into GRASS 4.1; signing up growers in study area; creating and publishing District newsletter; calibrating and operating polymer dispensing machinery for the purpose of limiting soil erosion; and assisting with associated district conservation practices.

Cartographer

USDA Natural Resources Conservation Service, Naches Soil Survey. August 21, 1996 - September 30, 1996. Duties included: transferring soil boundaries from orthophotos to mylar; checking all polygons for attribute errors; digitizing, editing and proofing all soil boundaries and attributes in LT4X GIS.

Earth Team Volunteer

USDA Natural Resources Conservation Service, Ellensburg Field Office. June 15, 1996 - August 18, 1996. Duties included: responsible for calibrating and operating polymer dispensing machinery for the purpose of limiting soil erosion; assistance with irrigation pipe surveys; SNOTEL site restoration, filing, answering phones.

Additional Experience:

Vice President

Washington Association of District Employees. December 3, 1997 to December 2, 1998. Duties include assisting with the development of summer training workshop; development of workshop brochure; coordinating workshop location and costs.

MICHAEL B. WARD
Terraqua Environmental, Wauconda, Washington

PROJECT ROLE Project manager

SPECIALIZATION Mr. Ward has been active in the field of fisheries ecology for twelve years and has been a consultant since 1989. Mr. Ward has been general manager of Terraqua Environmental Consulting since January 1995 and serves as the firm's lead fisheries ecologist. Mr. Ward's is an expert in the relationships between salmonid fisheries, water quality, and fish habitat in a wide variety of ecosystems.

RECENT PROFESSIONAL EXPERIENCE

Manager/Fisheries Ecologist, *Terraqua Environmental Consulting, (1995- present)*: Managing a growing environmental consulting business. Writing a restoration plan for anadromous salmonids in Battle Creek, Ca. Analyzing Pacific salmon harvest data to assist commercial salmon trollers in co-management of the ocean fishery. Studying largemouth and smallmouth bass utilization of spawning habitat in lakes of southern Ontario, Canada, using snorkeling. Conducted trout habitat utilization studies on the Pend Oreilles River, Wa. Developed non-linear fisheries production models for chinook salmon in the Trinity River, Ca. Statistically analyzed the efficiency of fish screens installed at the Potter Valley Hydroelectric Project, Ca. Compiled a list of potential affects of a copper mine on the aquatic resources of the Little North Santiam River, Or. Compared the effects of changes in ocean productivity on salmon and steelhead with the effects of the Potter Valley Hydroelectric Project, Ca. Created interpretive ecological descriptions of the Willapa Bay estuary, Wa.

Aquatic Ecologist, *Harza, Inc. (1993 - 1995)*: Studied the effects of heavy metal pollution and water quality problems on urbanized fish populations. Assessed the impacts of the North Umpqua River Hydroelectric Project, Or. on trout and salmon fisheries. Studied fish populations using SCUBA and snorkeling in Lake Washington and the Snoqualmie River, Wa.

Research Assistant, *Fisheries Research Institute, Univ. of Washington, (1990 - 1993)*: Sampled sockeye salmon in a month-long test gill-net fishery in the Bering Sea, Port Moller, Ak. Participated on the Salmonid Migration, Abundance, and Origin in North Pacific Offshore Waters project. Acted as fisheries scientist for the U. S. A. in joint fisheries research cruises on a Soviet vessel in the Bering Sea (spring 1991) and on a Canadian vessel (summer 1992).

Consultant to *Wm. Kier and Associates, (1989 - 1990)*: Sub-contracted to analyze and present fisheries catch and run size data of Klamath River anadromous salmon.

EDUCATION University of Washington, M.Sc. Fisheries, 1993; Humboldt State University, B.Sc. Fisheries, 1989

WILLIAM M. KIER
Kier Associates, Sausalito, California

PROJECT ROLE Policy Analyst, senior aquatic monitoring adviser

SPECIALIZATION Mr. Kier is a certified fisheries scientist with extensive professional experience in fisheries conservation and restoration planning, research administration, interagency program and policy coordination, project development and implementation.

PROFESSIONAL EXPERIENCE Mr. Kier began his career with the Inland Fisheries Division of the California Department of Fish and Game nearly 40 years ago researching the life history of native anadromous fishes. He was assistant coordinator of the state's fish hatchery system, editor of the scientific quarterly ***California Fish and Game Journal***, and manager of fishery and stream investigations throughout the north state for the department and the California Department of Water Resources.

During the 1960s Mr. Kier participated in the development of field methods for evaluating stream habitat quality and for determining streamflow requirements for both trout and salmon. He has contributed reports and provided extensive expert testimony on these subjects before the State Water Resources Control Board, the Federal Energy Regulatory Commission, and in judicial proceedings.

Mr. Kier served as the California State Senate's principal advisor on natural resources conservation and environmental protection (1967-74) and as director of the Senate's Office of Research and Policy Development (1974-83). As office director Mr. Kier organized and managed comprehensive programs of research and analysis, including those concerning fisheries and forestry management.

Mr. Kier served as principal consultant to the California Advisory Committee on Salmon and Steelhead (1986-89) in the development of a statewide plan to restore native anadromous fishes and their habitat. Mr. Kier supervised development of the 1991 ***Long Range Plan for the Klamath River Basin Conservation Area Fishery Restoration Program***, the Board of Forestry's 1993 report ***Assessing the Effectiveness of California's Forest Practice Rules In Protecting Water Quality***, and the 1996 report to the California Department of Fish and Game ***Private-Lands Aquatic Resource Monitoring Activities in Coastal Watersheds***.

Mr. Kier organized and directed the development of the Klamath Resource Information System (KRIS), a computer-based geographic information system for supporting watershed and fisheries assessment and restoration efforts in the Klamath River basin of northwestern California.

EDUCATION B.S., Zoology, Sacramento State University. Graduate studies in ecology, statistics. American Fisheries Society Certified Fisheries Scientist No. 1934.

PATRICK T. HIGGINS
Kier Associates, Arcata, California

PROJECT ROLE Information Analyst

SPECIALIZATION Pat Higgins has substantial expertise in fisheries biology, including the assessment of fish populations and their habitat, watershed assessment, planning and implementing water quality and fish habitat restoration.

PROFESSIONAL EXPERIENCE As a member of the Kier Associates team that prepared the 1991 ***Klamath Long Range Plan***, Pat Higgins developed the Plan's information concerning habitat restoration, the status and trends of the basin's several anadromous fish populations and the review of historic efforts to restore and enhance the basin's fish resources.

Pat has served as Kier Associates' field coordinator in the development of the Klamath Resource Information System (KRIS), identifying and gathering information concerning fish and watershed conditions throughout the basin and incorporating that information into KRIS, assisting the basin's restoration communities in the design and implementation of on-the-ground restoration projects, assisting in the design of project monitoring plans, training community volunteers in water quality and aquatic resource monitoring methods, and assisting watershed education in the basin's schools.

Pat conducted the fishery analysis element of the ***Garcia River Watershed Enhancement Plan*** for the Mendocino County Resource Conservation District and performed the fishery habitat/limiting factors analysis for the USBR/Trinity County RCD ***Action Plan for Restoration of the South Fork Trinity River Watershed and Its Fisheries.***

Pat has served as a stream monitoring adviser to the Mendocino Watershed Service, organized community-based instream monitoring programs in the Shasta, Scott and Salmon rivers, and recently collaborated with Jan Derksen in the development of a South Fork Trinity River monitoring program based in the Klamath Resource Information System, for the Trinity County Resource Conservation District.

Pat chairs the American Fisheries Society (Western Division) Native Salmon Stocks Committee and is co-author of the Society's publication ***Factors In Northern California Threatening Stocks With Extinction.***

EDUCATION

B. A. Natural Resources Management, Fisheries. Humboldt State University

Graduate studies in fisheries, watershed processes, soils, aquatic resource monitoring, Humboldt State

JAN DERKSEN, Ph.D.
Kier Associates, Southern Humboldt Office, California

PROJECT ROLE Research and database design consultant, GIS coordinator

SPECIALIZATION Dr. Derksen is Kier Associates' research project design specialist. He has assisted the firm on a number of recent successful projects that required the design of databases, the gathering and entry of field survey data, and the analysis and presentation of information in reports and computer-based systems.

PROFESSIONAL EXPERIENCE Dr. Derksen served on the computer science faculty at Humboldt State University before joining Kier Associates. He has provided water quality and stream modeling services to the North Coast Regional Water Quality Control Board and watershed modeling services to major North Coast industrial forest landowners.

Dr. Derksen was co-investigator, along with Dr. Larry Fox of Humboldt State University and Dr. Ron Iverson of the U.S. Fish and Wildlife Service, in the 1996 study ***Using Landsat Thematic Mapper Imagery to Support Salmon Restoration Efforts in a Large Pacific Coast Watershed***. The study demonstrated the value of using Landsat TM data to detect change over time in riparian vegetation conditions along the Shasta and Scott rivers. The results of the study are being incorporated into the Klamath Resource Information System (KRIS). Dr. Derksen is KRIS' principal developer.

Dr. Derksen has recently completed a demonstration project, using the Klamath Resource Information System, involving the model developed by Montgomery and Dietrich to evaluate shallow landsliding potentials.

EDUCATION

Ph.D. Stanford University

M.S. and B.S. University of Delph, The Netherlands

Section 10. Information/technology transfer

Information transfer is the specific goal of this proposal. For details, please refer to the objectives and methods of this proposal.

Congratulations!