RESEARCH PROJECT PROPOSAL A: LITERATURE REVIEW AND DEVELOPMENT OF A STUDY PLAN TO ASSESS THE EFFECTS OF COALBED NATURAL GAS ACTIVITIES ON FISH ASSEMBLAGES

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The recent development of coalbed methane (CBM) resources has created a need for scientifically sound information by agency, tribal, and industry resource managers in Montana and Wyoming regarding its potential effects on the fish assemblages in nearby streams. Because CBM development involves production and disposal of coalbed ground water (often containing high concentrations of dissolved ions), as well as surface environment modifications, potential exists for substantial effects on aquatic environments and fauna. Little research has been conducted on the effects of CBM development on fish assemblages.

This proposal is to obtain funding sufficient to complete two objectives:

1) Conduct a comprehensive literature review on the effects of CBM development and discharge of coalbed ground water on aquatic life. This would include assembling and summarizing all available published and unpublished research.
2) Develop a study plan and proposal to conduct a multiyear research project on the effects of coalbed methane development on fish assemblages in streams in Montana and Wyoming.

We envision hiring a graduate student to assist us in writing the literature review and developing a study plan to assess the effects of CBM development on fishes in the field and possibly in the laboratory. Because of the differing views of stakeholders, and sometimes litigious nature surrounding the CBM development issue, it is crucial that a scientifically sound research project is developed. We will draw upon our experience in studying the ecology, distribution, and status of prairie fishes to produce the research project. For example, our recently developed prairie fish Index of Biotic Integrity is a tool with much potential for use in assessing the effects of CBM development on streams.

Proposed budget for literature review

Salary/Benefits	
Graduate student (6 months)	$7,200
Graduate student benefits	$144
Tuition	
Graduate Student Tuition	$2,400
Supplies	
Computer, copies, etc.	$2,500
Travel	
Travel to CBM sites, meeting with BLM, CBM developers	$1,500
Communications	
phone, postage, FAX	$200
Direct Costs	$13,944
RWO overhead @ 10%	$1,394
IDC's @ 5% USGS	$767
Total	**$16,105**

Proposed budget for project study and completion (developed by Joe Platz as an estimate based on the literature review budget).

Salary/Benefits	
Graduate student (3 years)	$45,000
Graduate student benefits	$1000
Field/lab assistant plus benefits(up to 2 years of time)	$30,000
Tuition	
Graduate Student Tuition	$15,000
Supplies	
Computer, copies, lab materials, etc.	$30,000
Travel	
Travel to CBM sites, meeting with BLM, CBM developers	$10,000
Communications	
phone, postage, FAX	$1500
Direct Costs	$132,500
RWO overhead @ 10%	$13,250
IDC's @ 5% USGS	$6625
Total	**$152,375**

Research Project Proposal B: Development of a Prairie Fish Index of Biotic Integrity for streams in Wyoming and Montana to Assess the Effects of Coal Bed Natural Gas Activities on Fish Assemblages.

The recent development of coalbed natural gas resources has created a need for scientifically sound information by agency, tribal, and industry resource managers in Montana and Wyoming regarding its potential effects on the fish assemblages in nearby streams. A Prairie Fish Index of Biotic Integrity is needed to adequately assess effects of coalbed natural gas development on fish assemblages.

This proposal is to obtain funding sufficient to complete one objective:

1) Conduct a literature review, laboratory and field analysis to develop a Prairie Fish Index of Biotic Integrity for streams in Wyoming and Montana.

A prairie fish Index of Biotic Integrity has already been developed for Eastern Montana streams. It is a tool with much potential for use in assessing the effects of CBM. Because fish assemblages may be different in Wyoming, it is proposed that a matrix be developed for Montana and Wyoming prairie fish streams. A graduate student will most likely be hired to assist in writing the literature review and developing a study plan to assess the effects of CBM development on fishes in the field and possibly in the laboratory.

Proposed budget for project

Salary/Benefits	
Graduate student (two years)	$30,000
Graduate student benefits	$ 750
Field/lab assistant plus benefits(up to 1 year of time)	$15,000
Tuition	
Graduate Student Tuition	$10,000
Supplies	
Computer, copies, lab materials, etc.	$20,000
Travel	
Travel to CBM sites, meeting with BLM, CBM developers	$7,500
Communications	
phone, postage, FAX	$1000
Direct Costs	$84,250
RWO overhead @ 10%	$8,425
IDC's @ 5% USGS	$4,212
Total	**$96,887**

Research Project Proposal C: Impacts to Amphibians and Reptiles in Relation to Effects from Coal Bed Natural Gas Production

I. Background

The Montana and Wyoming BLM have prepared Environmental Impact Statements (EIS) and Environmental Analyses (EA) on site specific areas. These documents have analyzed the impacts to resources as a result of oil and gas and CBM development. Future EAs will be written to cover other site-specific areas within the EIS.

Within the EIS' & EAs', potential effects to amphibians and reptiles are identified. Major concerns are that each CBM well produces a large amount of water that requires disposal. This produced water can be of variable quality but often has high concentrations of salts, such as sodium sulfate and sodium bicarbonate. Additionally, this water can exceed water quality standards for many metals, nitrate and ammonia. The most commonly used disposal option is to discharge produced water into streams or to store the water in reservoirs (have the potential to leach CBM water into streams).

This proposed study will seek to identify impacts to the amphibians and reptiles, if any, related to the discharge/storage/drawdown of CBM produced water. Several variables will be evaluated: using a stream/spring/wetland/reservoir inventory system, presence/absence survey, mark/recapture survey, and a basic water quality assessment.

II. Objective(s)

The objectives of this Statement of Work are: (A) To identify the ecosystem "baseline" for amphibians/reptiles. (B) To identify the presence/absence of amphibians/reptiles within the project area. (C) To identify amphibians and reptile habitat within the project area. (D) To identify the effects of CBM production on amphibian and reptile habitat.

III. Scope

The project area consists of the Coal Bed Natural Gas development within the area identified for development in the EIS'. Areas already developed and those proposed in the foreseeable future will take precedent. Study sites will be within the ephemeral, intermittent, and perennial streams; reservoirs; wetlands; and natural springs/seeps (where they occur). Site selection will evaluate ecosystems with and without produced water impacts.

IV. Tasks

A. To conduct presence/absence and habitat inventories for amphibians/reptiles within the ephemeral, intermittent, and perennial streams; reservoirs; wetlands; and natural springs/seeps (where they occur) in the project area. Species level identification will be required.

B. To process (where applicable) and analyze the following water quality parameters in relation to amphibians and reptiles: water temperature, dissolved oxygen, pH, and specific conductance (umhos/cm) within the above project area.

C. A well written technical report detailing:

1. Results and discussion of data collected.
2. Conduct a review of unpublished and published literature pertaining to:
(a) Habitat and population requirements of amphibians and reptiles in the project area. (b) Addressing the issue of changes in water quantity and water quality/chemistry in relation to amphibians and reptiles and their habitat.
3. Photographs of representative habitats will be installed in the final report.
4. Recommend management applications.

V. Period of Performance/Deliverables

A. Work will begin within ten calendar days after contract or research proposal is awarded and appropriate environmental conditions are achieved.
B. Three copies of a draft report will be submitted to the BLM no later than December 31, 2007.
C. The Contracting Officers Representative/Inspectors will review the draft report and comment on their adequacy within 30 calendar days of submission. The contractor will then have 30 days to submit ten copies of the final after receipt of comments from the COR. The final report will include: GIS maps, locations, and an electronic copy/copies of the report.

VI. Assumptions:

1. The bidder will provide a summary of how the work would be completed. This should include methodology for an ecological baseline, amount of sampling sites and an ecological risk assessment.
2. The bidder will have a working knowledge of amphibians, reptiles and water quality measurements.
3. All materials needed for the project will be supplied by the bidder.

Project costs:

Proposed project costs would be the same as those for the "Research Project Proposal: Literature Review and Development of a Study Plan to Assess the Effects on Coalbed Natural Gas Activities on Fish Assemblages". The proposed total cost for the literature review is $16,105 and the proposed total cost of the analysis/project completion is: $152,375.