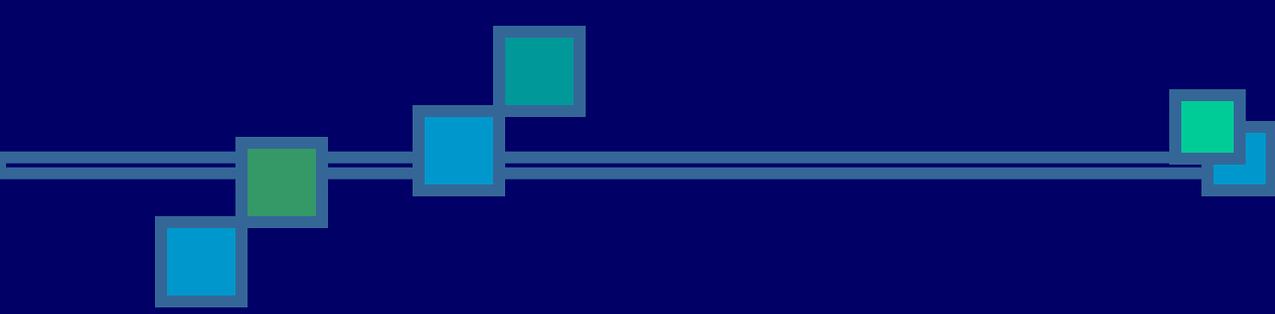


# AQUATIC BIOTA MONITORING

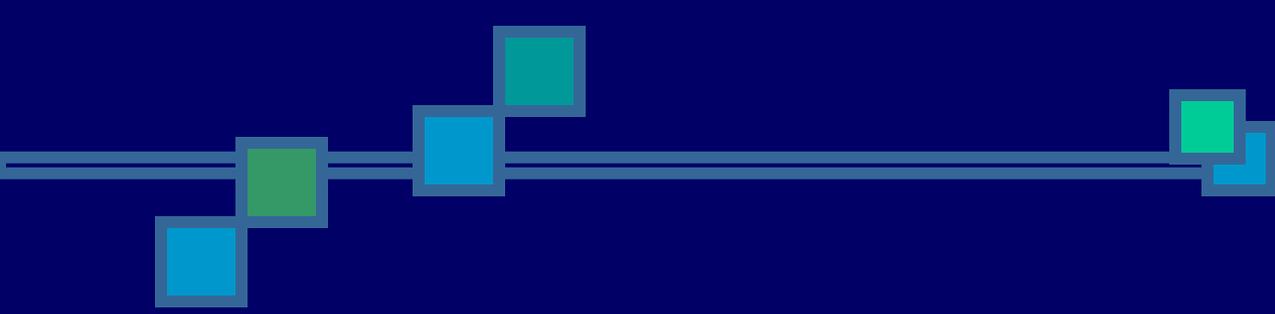
## Aquatic Task Group





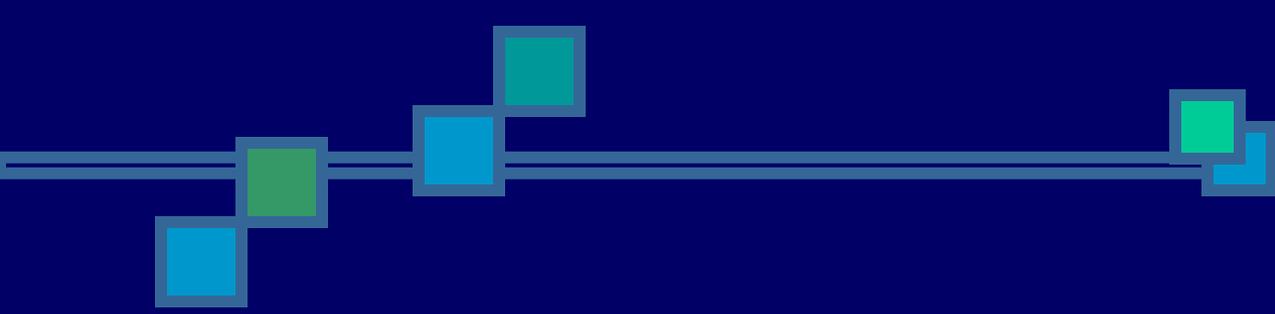
# BASIC QUESTION

- What effect does (or will) CBNG produced water have on aquatic biota and their habitats?
- 

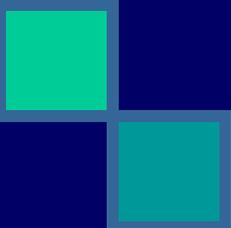


# Objectives

- Establish baseline conditions for aquatic biota and their habitat
  - Evaluate existing or potential effects of CBNG water discharge on aquatic life
- 



# Sub-Task Monitoring Plans

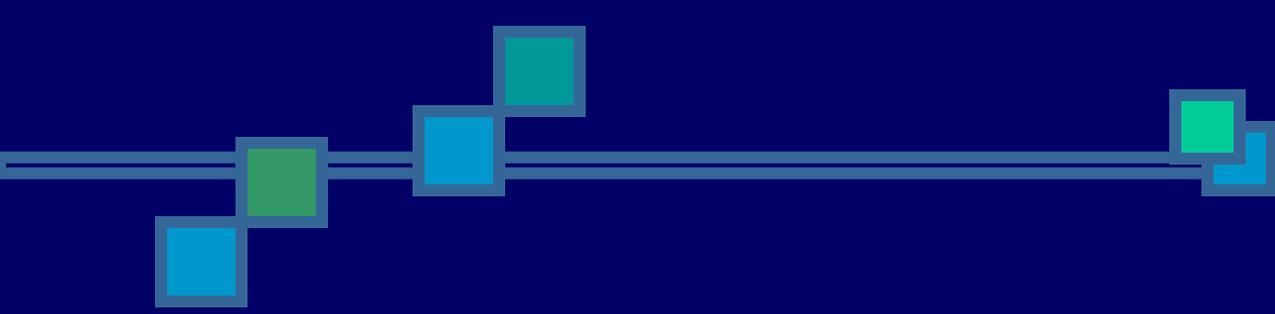
- 
- Aquatic/Riparian Habitat
  - Fish
  - Macroinvertebrates
  - Amphibians (Herps)
  - Research
- 



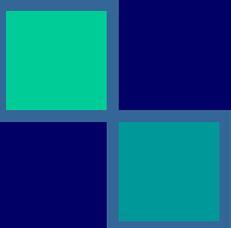
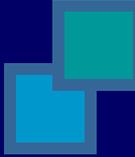
# Watersheds to be monitored

*Data on current biotic conditions will be benchmark against which subsequent monitoring data will be compared to assess CBNG effects.*

- Rosebud Creek (MT): 3 sites
  - Tongue River (MT & WY): 18 MT/3WY
  - Powder River (MT & WY): 6MT/8WY
  - Belle Fourche River (Wyoming): 8 sites
  - Cheyenne River (Wyoming): 8 sites
- 



# Stream segment sampling Reach

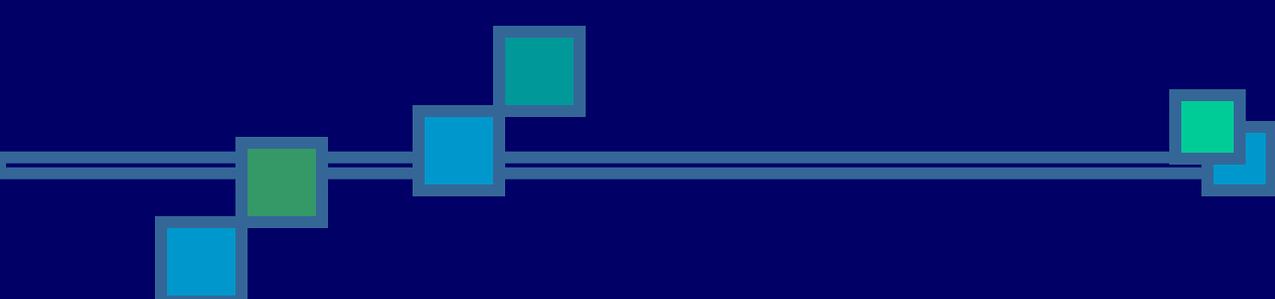
- 
- 2 Meander lengths\*; 20 bank full channel widths; or 500 meters --- whichever is greater.
  - \*Larger streams (Tongue or Powder): length may change to capture all habitat types (esp. for fish).
- 

# Habitat Monitoring Plan

A scenic view of a riverbank. In the foreground, there are tall, dry grasses and a large, dark tree trunk. The river flows from the right towards the center. A person in a red shirt and blue pants is standing in a small boat on the water. In the background, there are more trees and a thatched-roof building under a clear blue sky.

**Aquatic life habitat is an essential part of aquatic community assemblages and life histories.**

**The condition and type of habitat can define species diversity, growth rates, and abundance.**



# Habitat Monitoring

Each site once per year for 3 years

- Current type of aquatic habitat available
  - Assess changes over time
  - Determine if changes are due to CBNG
  - Develop mitigation measures
- 

# Fish Monitoring Plan

Determine native and introduced species composition and distribution (temporally and spatially) relative to their available habitat





# Fish Monitoring

- 3 times per site per year  
(Pre and post runoff and late season)
  - Repeat annually for 3 years to establish baseline condition
  - Protocols still being evaluated (MT, WY, EMAP, NAWQA)
- 

# Macroinvertebrate (bugs) Monitoring Plan

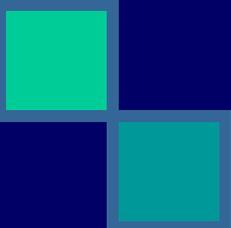


**Use measures of macroinvertebrate community composition and tolerance to assess impacts of CBNG development on aquatic life**



# Macroinvertebrate Monitoring

Once each year per site during summer/fall low water period

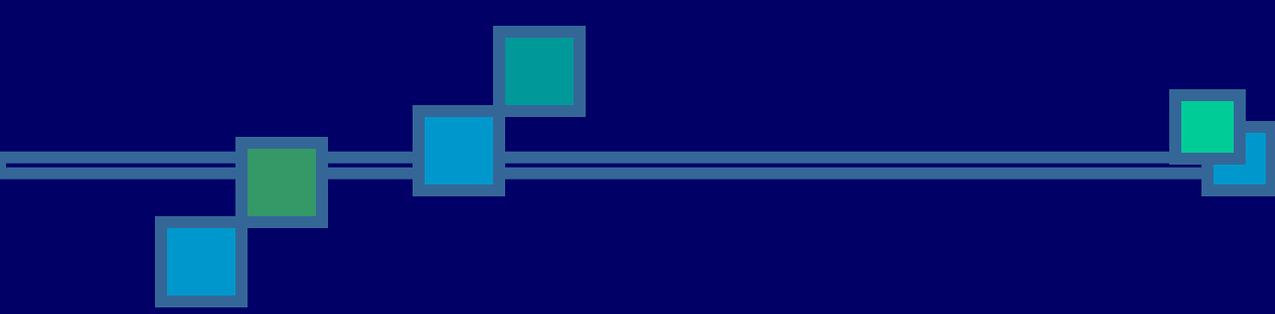
- 
- Semi-qualitative sample (relative abundance within fast flowing habitat)
  - Qualitative multi-habitat sample
- 

Species ID and quantification to be done through existing BLM contract

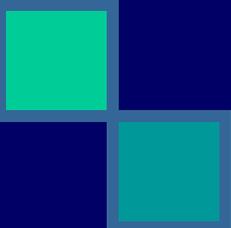
# Amphibians and Aquatic Dependent Reptiles (Herps) Monitoring Plan

- Recommended for development - See research proposal





# Research Proposals

- 
- A. Literature review and study plan development to assess effects of CBNG activities on fish assemblages.
  - B. Development of a prairie fish index of biotic integrity for streams in WY and MT.
  - C. Impacts to amphibians and reptiles in relation to effects from CBNG production.
- 



# Estimated Costs

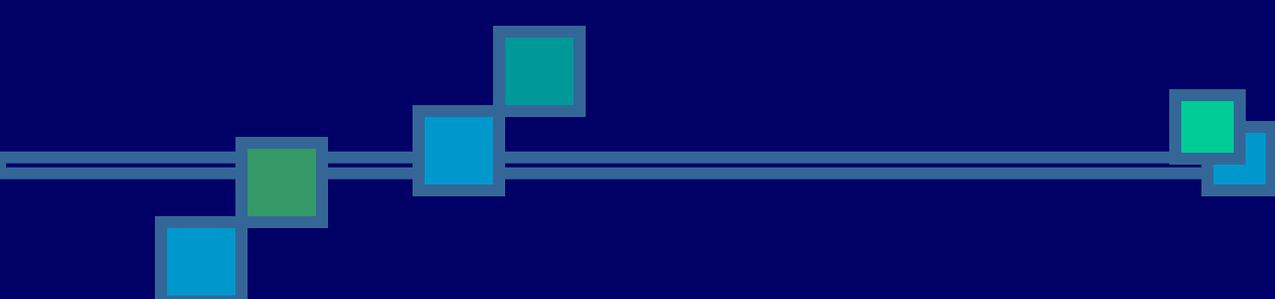
Based on hiring additional GS-level personnel w/in the BLM (2 field crews of 3 seasonal techs and 1 FTE fishery biologist)

## Monitoring

- Per station: \$2,895
  - Total: \$217,530 annually (\$108,765 per state)
- 

## Research

- \$433,400 (one-time cost)



# Limitations and unresolved issues

- No sampling sites to specifically monitor aquatic biota or habitat within CBNG discharge. Proposed sampling is to establish baseline.
- 

# Other issues for IWG to consider

- Sentinel fish monitoring
- Periphyton
- Ephemeral and intermittent stream channels
- Below, within, and above CBM discharge point monitoring (after baseline?)
- Database to link all groups information
- Standing water effects on biota – esp. Herps
- Literature search and compilation for all TGs

An aerial photograph of a large, circular crater. The interior of the crater is dark and shadowed, contrasting with the lighter, textured ground surrounding it. The ground appears to be a mix of brown and tan colors, possibly due to soil or vegetation. The crater's rim is visible, and the overall scene is captured from a high angle.

How much deeper do we look  
to find answers?



# The ATG Team:

Bob McDowell

Joe Platz

Jeremy Zumberge

Larry Gerard

George Jordon

Steve Regele

Dave Zafft

Brad Schmitz

Paula Guenther-Gloss

Brad Rogers

Jerry Kaiser