

Management Plan: Zebra Mussels

Zebra Mussels take over ecosystems and filter all oxygen and nutrients from fresh bodies of water through out the United States.

1. Future treatment to inhibit immune system response to parasites and bacterial infections.

- *If the invasive zebra mussel takes hold in the Four Corners area economical trouble by entering pipelines and boat systems. Also zebra mussels cause ecological collapse, killing most to all other living species in infected bodies of water.*
- *The United States government already is paying millions of dollars because of zebra mussels and the problems they are causing.*
- *If zebra mussels become a problem a problem in the Four Corners, then perhaps immune system inhibition can be used to increase zebra mussel mortality.*
- *Introduce zebra mussel parasites called Ciliates and Trematodes.*
- *These Parasites can cause bacterial infection.*
- *If a chemical can be administered to inhibit immune response to these parasites, zebra mussel mortality.*
- *Organisms capable of compatibly displacing zebra mussels from hard substrates include sponges, amphipods, algae, bryozoans, hydrozoans coelenterates.*
- *If the zebra mussels become a problem, the Division of Wildlife will carry out the treatment to inhibit immune system response.*
- *The season in which the mollusks will be most vulnerable will be in the summer months when parasite loads and bacterial loads are likely to be highest.*
- *The most likely place where zebra mussels will be affected will be in Lake Powell located in southeastern Utah.*

Pro

- *If studies and research is discovered to work, all zebra mussels throughout the United States could be controlled and the original ecosystems could recover.*

Con

- *Negative impact on non-target species*
- *This management technique hinges on continued research like that done at Michigan State University.*

2. Make the clean, drain, dry method required by law when commuting to any body of water near zebra mussel infested waters.

- *The Division of Wildlife Resources will further enforce the clean, drain, and dry method and make it a law to be inspected when commuting from lake to lake around the four corners.*
- *Random checkpoints will be set-up around Lake Powell, and Lake Mead in Utah.*
- *The National Park Service will pay for the checkpoints.*
- *A bill needs to be written and sent for review by the following states of Utah, Colorado, New Mexico, and Arizona.*
- *Estimating the law will be most effective and enforced by 2015*

Pro

- *Could stop the further spread of the zebra mussel completely throughout the Four Corners.*

Con

- *The collaboration and cooperation of the states of Utah, Colorado, New Mexico, and Arizona could potentially be a problem.*

Zebra mussels absorb most oxygen and nutrients in bodies of fresh water leaving very little to none for other native organisms.

3. Introduce a hybrid ecosystem that doesn't need as much oxygen or nutrients.

- *In the near future this process will be tested in the field.*
- *Studies need to be held to find species that can survive in a low phosphate and oxygen environment but still prefers an environment and climate where zebra mussels are invading.*
- *This new ecosystem would eventually grow larger and larger then eventually start to control the zebra mussel population.*
- *This will be held by the Division of Wildlife.*
- *Efforts from Stanford University, the University of Hawaii at Hilo and the Forest Service have studies on hybrid ecosystems to control invasive species*
- *Plans to introduce a hybrid ecosystem needs more research to find species that can live under the population extent of the zebra mussel.*
- *The plan to introduce a hybrid ecosystem will most likely be available after 2020.*
- *Final costs of this project are estimated to be over a million dollars due to research expenses.*

Pro

- *Once the hybrid ecosystem takes its effect, very little effort will have to be done by humans.*

Con

- *Studies have not yet shown whether this method is effective*