

## Affects of CLIMATE CHANGE/ GLOBAL WARMING

On the

Pyramid Lake Indian Reservation: Northern Nevada Great Basin

### I. Hydrological Models are predicting:

#### A. Snow levels increasing in elevation.

1. Snow caps reduced by 2/3 by 2050 year....which will reduce water availability for:
  - \* Upstream Reservoirs → affects M&I /Ag/ Drinking / recreation water supplies...
  - \* In stream flows → affects WQ, WQS, and Beneficial Use's (esp. when WW is present)
  - \* Flows required for spawning → E & T species of fish
  - \* Flows required for riparian maintenance → affects plant health. E.g. drought stress -> leads to diseases/ and affects growth. (Shading reduces water temperatures...)
  - \* Pyramid Lake → reducing lake elevations affect WQ, WQS, TDS, and alkalinity  
Increase TDS affects endangered fish and reduces species abundance/diversity

#### B. Decrease Precipitation / Increase Temperatures Trends

1. Conducive to Invasive (exotic) plant and animal species, not to Native species
  - Provides a favorable environment non-native species to 'thrive', and out-compete native plants for nutrients, space, etc...
  - Warmer temperatures conducive to mormon crickets. Colder temperatures (below freezing) act as a natural control – killing mormon cricket larvae during the spring time.
  - Non-native plants (e.g. cheat grass, bromus tetorum) provide "fuel" for range fires. The increase of fires has removed a lot of native plants, and provides an environment for non-native plants to take over range and riparian areas.
2. Loss of native (medicinal) plants, animal species, range (overuse), riparian, springs, seeps,...
3. Loss of habitat for plant and animal species, Shift in ecological zones, native species composition,... Affects → Aquatic Life, wildlife, and livestock AUMS's
4. Dewatering of lakes, seeps, springs, wetlands, and riparian areas.  
(further exasperated by municipalities going after surface & ground waters and moving groundwater supplies out-of-basin to support M & I growth & housing developments).
5. Decreases water available to recharge aquifers
6. Increases WQ problems
7. Increases Air Quality problems > Dry lake beds, e.g. Honey Lake, Winnemucca Lake, (& Owens valley, Salton sea)
  - \* Increases Asthma/Respiratory problems
8. Increase of Water Right purchases and "prices" due to demand/ competition of developers seeking water to support support M & I growth & housing projects.  
>Increases WWTP effluent into the Truckee River > which affects WQ and aquatic life.
9. Affects crop production > drier climate > less water for Irrigation, etc..

### II. Adaptative Management Strategies (Mitigation) to deal with climate change.

- Removal of non-native plant species that compete with native plants for water, soil nutrients, and space (e.g. tamarisk, tall whitetop removal).
- Planting of Native 'drought tolerant' plants to replace non-native plant species.
- Purchase water rights and dedicate 'them' for in-stream flows (streams, lakes,...), i.e. for the purposes of protecting biological integrity and riparian habitat. "Dedicated" water rights for in-stream flows will maintain riparian maintenance, improve water quality, and provide flows for spawning of fish and aquatic life.
- Working with upstream stakeholders to develop a watershed plan for using/ managing water to protect regional beneficial uses. E.g. the Pyramid Lake Paiute Tribe worked since 1992 to develop the "Truckee River Operating Agreement" (TROA) with all the major stakeholders within the Truckee River watershed basin. The final TROA document should be signed by this fall.