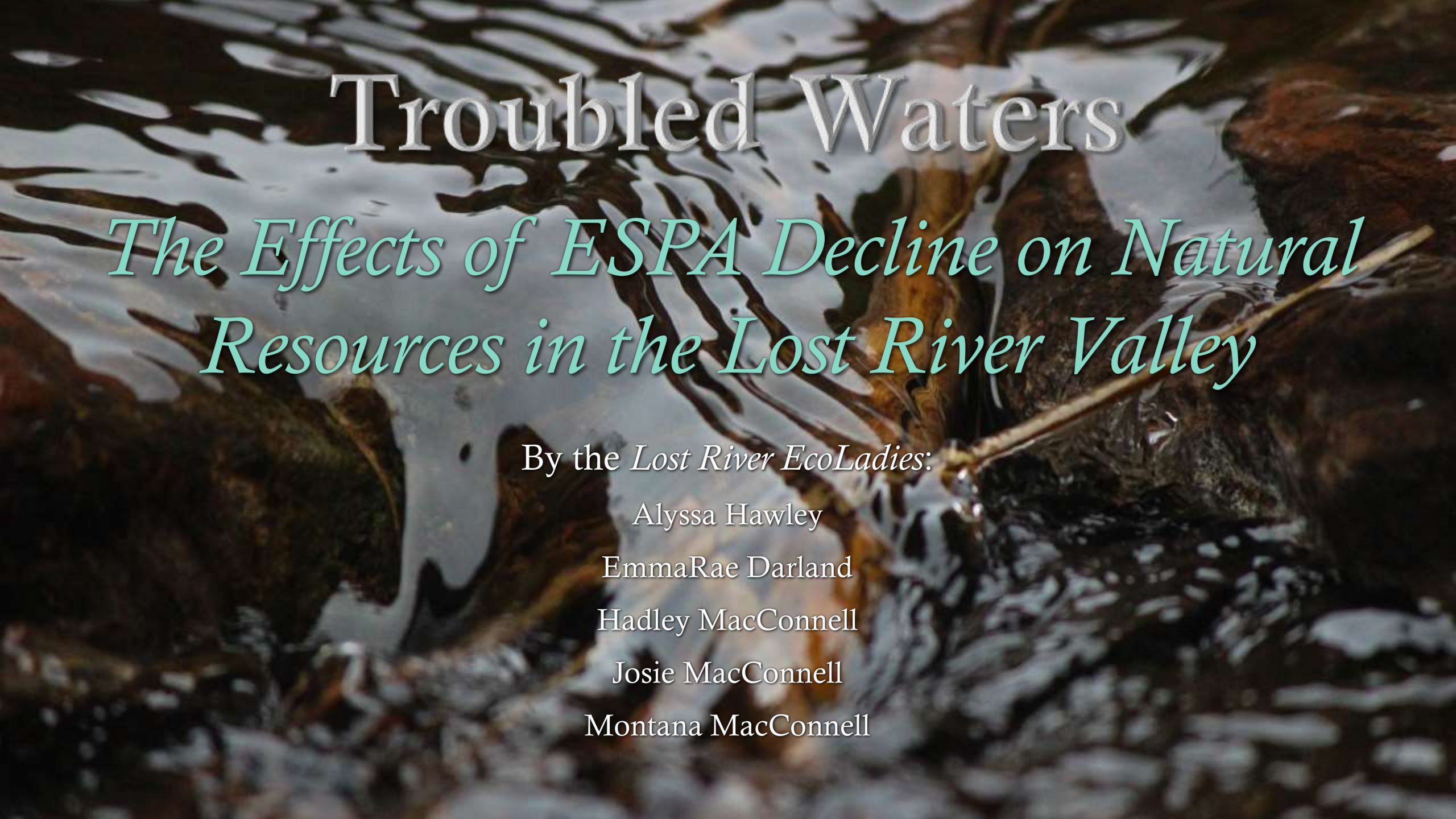

# Troubled Waters

## *The Effects of ESPA Decline on Natural Resources in the Lost River Valley*


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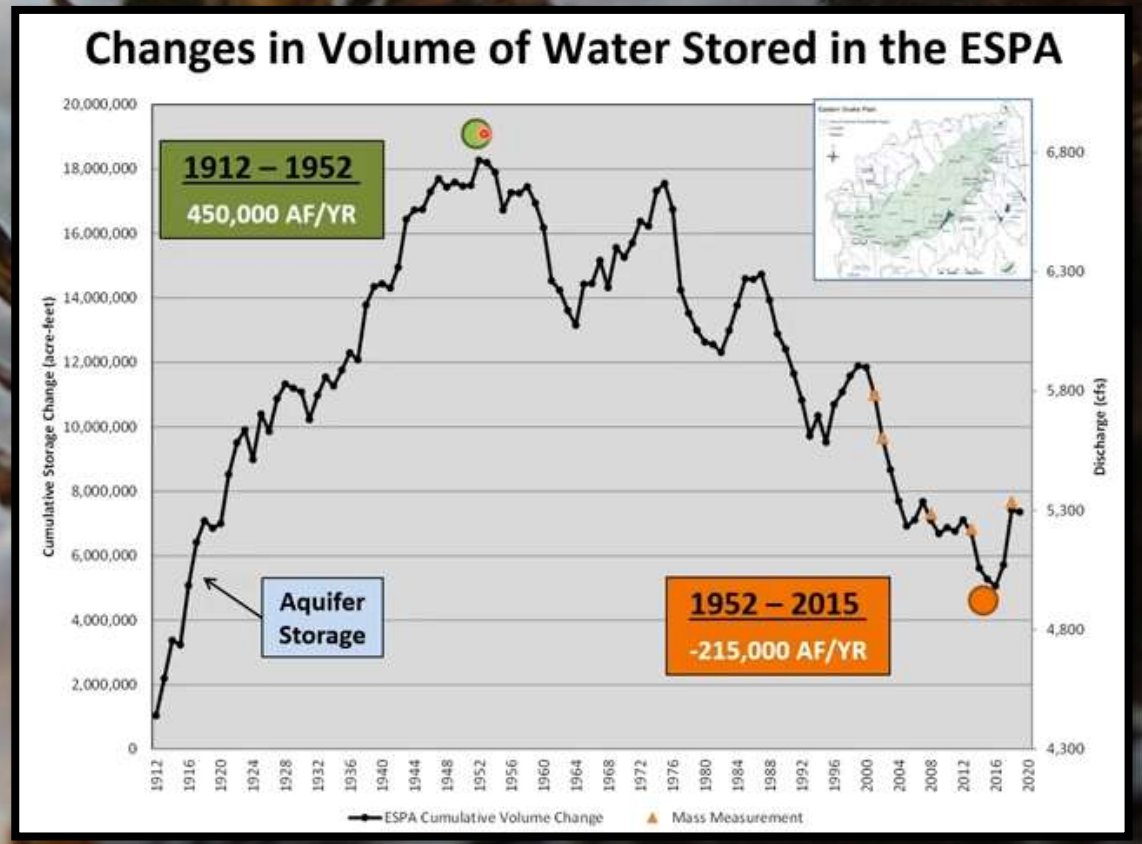
# The Issue: ESPA Decline

Hidden underneath Idaho's Snake River Plain sprawls the ESPA (Eastern Snake Plain Aquifer), a body of groundwater almost the size of Lake Erie. The ESPA is a crucial water source… yet it's quantity has greatly diminished since 1952, resulting in declining storage as well as declining spring yield. With all that depends on the ESPA (including local ecosystems, fulfillment of water rights, and much of Idaho's economy), it is key that the aquifer be restored to its former glory.

- The Cause: yearly input = 11.2 MAF, yearly output = 11.6 MAF
  - 11.2 – 11.6 = -0.4… that's an annual deficit of 400,000 AF.

Current solutions include artificial recharge, demand reduction, groundwater-to-surface water conversions, cloud seeding, and continued research. However, this is only the beginning of a long and hard journey to the recovery and replenishment of the ESPA.



# The ESPA and Aquatics

The decline of storage in the ESPA has a variety of impacts on natural resources in eastern Idaho. Water resources, naturally, have a very close relationship with the ESPA. The interactions between the surface water and the ground water are so direct in the Snake River Plain that it is truly a single, dynamic water system.

The ESPA affects water resources by:

- Determining aquifer water output for each water year.
- Limiting water budgets during periods of diminishment.
- Operating as a crucial component of the water cycle.

The water resources affect the ESPA by:

- Controlling amounts available for recharge from various watersheds.
- Transporting qualities such as turbidity, dissolved oxygen, and pH that may change the quality of the aquifer itself.

# The ESPA and Soils

Soil is perhaps the most underappreciated resource, yet its importance is tremendous. This holds true on the Snake River Plain.

The ESPA is actually made possible by fine-grained volcanic basalt layers (indicated in grey) deep inside eastern Idaho, but the impacts do not end there.

Soil also works as a medium that can hold and release water and nutrients:

- Recharge abilities of a certain area depend on soil properties, such as infiltration, which indicates permeability.
- Quality of water entering the ESPA is also determined by the soil's action as a natural filter.
- Unhealthy or diminished topsoil can allow unfiltered water with harmful properties to penetrate the ESPA.

# The ESPA and Forestry

"Lack of water," Professor Randy Brooks explained to the EcoLadies, "causes trees to become stressed… eventually, they can be a fire hazard." Stress also slows tree growth, which renders a forest less productive.

The Snake River Plain isn't exactly a lush pine forest, but there is a relationship between forestry and the ESPA nonetheless.

- Forests are active in the water cycle; they regulate the rate at which moisture is transpired into the atmosphere and absorb precipitation.
- Trees are also important components of watersheds, as they prevent erosion, promote infiltration, and affect the speed of runoff.

The role of trees in the water cycle and in individual watersheds influence water retention, makeup of downstream ecosystems, and amount and quality of available runoff. In the case of the ESPA, upstream forested watersheds are very impactful to the health and level of the aquifer supply.

# The ESPA and Wildlife

Water is an indispensable component of wildlife habitat, making the relationship between Idaho wildlife and the ESPA one of extreme dependence. As with any ecosystem, there is a very sensitive balance between species, their needs, and their interactions. With the ESPA down, this balance is affected as animals are in heavier competition with each other and with humans to get the water they need.

- Lower water quantity means lower carrying capacities for animal populations.
- Aquaculture and water obligate species, especially, rely on water quantity, quality, and availability.
  - Below major ESPA springs are protections on water levels to ensure fish population stability.
  - Chinook Salmon are listed as threatened, meaning that their habitat needs are protected by federal law.
  - Without certain water levels, spawning cannot occur, which puts the life cycle of fish in jeopardy.

# Lost and Found

At the edge of the black expanses of the Snake River Plain sits a sagebrush prairie with two meandering rivers overlooked by the Pioneer Mountains. Welcome to the Lost River Valley!

The Big Lost River flows from its source deep in the Pioneer Mountains through the valley to its "sinks," where it widens into a desert marshland and is absorbed straight into the ESPA. The Little Lost River takes a similar route from a different direction, seeping into the ground a few miles past the town of Howe. The disappearance of both these rivers are what earned them the title of "lost." However, to the ESPA, these rivers are very much *found*, as they provide an important source of the aquifer's water.

# Local Economic Effects

This lost/found relationship with the ESPA has several effects on the local community.

- Water rights in the Big Lost River Watershed are primarily junior to those below the ESPA, meaning that local water usage can be limited by downstream water calls.
- Local recharge initiatives include gravel pits and limiting irrigation outtake from the rivers, which influences agricultural operations.

The depletion of the ESPA is very much a local concern. Jesse Fullmer of the NRCS explained two possible approaches to addressing the issue:

- Mentality #1: Revert to flood irrigation (which works "for the aquifer, not against it"). However, it would be extremely difficult to implement old tactics.
- Mentality #2: Become more efficient: only needed water goes onto the fields. All the equipment would be 95% efficient, as opposed to 75%. The leftover water would go forward to recharge the aquifer.

# Local Ecosystem Effects

ESPA decline affects Lost River Valley ecosystems and wildlife management, as well.

- Big Lost Mountain White Fish, a local species, may end up stranded in recharge pits.
  - "This isn't always an issue," says Cassie Wood, who works for Trout Unlimited. "But in years when the population is down we can do 'fish salvaging' to return those individuals to the river."
  - There are also fish screens in place on some canals and ditches to prevent fish from finding there way into the pits.
- Greater Sage Grouse are dependent on riparian areas in the spring.
  - When the species was being evaluated for the Endangered Species List, part of Idaho's plan to protect sage grouse without needing the listing involved protecting streamside habitats on the Lost River.
- "Historically," Wood told the EcoLadies team, "there was 10 times the current water surface area in the US, in our valley too… and it was basically the beavers."
  - Beavers, before being diminished by the fur trade, provided natural recharge with their dam-building skills.
  - What if beavers could become a valuable tool for the adaptive management of Lost River water and the ESPA?

# Conclusion

Standing in the middle of the flood basalt desert that makes up the Snake River Plain, it might be hard to believe that water is nearby… but deep below the dust, brush, and rock lies a true Idaho gem: the ESPA. However, for eastern Idaho, those are troubled waters. In the last 70 years, the ESPA has declined due to input that can't meet output. Countless factors are affected by this issue.

For one watershed in the big picture of Idaho, the lost and found relationship with the ESPA is very influential to the local economy, community, and ecosystem. From the smallest sage grouse chick to the longest potato pivot, the Lost River Valley is tied to the ESPA and its troubled waters.