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| **Key Points / Questions** | **Reading Questions** |
| As you watch the assigned videos and readings, record any key terms, concepts, or ideas in the space below. Document any questions that arise as well. | 1. What are the reasons why fish may migrate?

Fish migrate to find habitat, food, and places to spawn and to escape extreme temperatures and water flows. |
| 1. Describe the typical life cycle of salmon.

Salmon are born in rivers that can be more than 1000 km from the ocean. As juveniles, they migrate to the ocean where they grow into adults. As adults, they return to the river from which they were born, perhaps near the exact location of birth. Adults do not feed during the migration, and males develop characteristics that distinguish them from females. Adults spawn and then die. The eggs hatch and develop into larval fish and then juveniles, carrying the life cycle forward as the next generation. |
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| 1. How do migrating salmon influence tree growth? In return, how do healthy trees benefit salmon?

Migrating salmon carry with them nitrogen and phosphorus that benefit the ecosystem surrounding the rivers. Vegetation around the waterways grows much faster. The roots of the vegetation prevent erosion and sedimentation, which benefits salmon eggs and nests. The vegetation provides shade, which also protect migrating adult salmon and young salmon. |
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| 1. Describe the ways in which migrating salmon affect ecosystems.

Migrating salmon carry nutrients from the ocean to terrestrial ecosystems. Salmon are prey that are consumed by bears, eagles, and other predators. Scavengers eat dead carcasses in the stream or left in the forest by predators. Relationships have been found among salmon and wildflowers, bushes, birds, and other freshwater fish. The growth of vegetation along streams corresponds to high salmon abundance. |
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| 1. What human activities have impacted Pacific salmon populations?

Migration routes have been blocked or obstructed by hydroelectric dams and road culverts (at road crossings). Stream habitat has been degraded by logging, urbanization, and resource extraction. Some populations have suffered from either chronic or acute pollution events, and some have been overfished and lack genetic diversity due to introduction of hatchery bred- fish. Climate change is increasing water temperature and increasing drought, affecting the timing of migrations and the ability of salmon to migrate upstream and downstream. |
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| 6. Why are salmon getting smaller? What impact does this have on ecosystems?Adult salmon returning from the ocean are smaller in size because they are returning from the ocean to spawn at younger ages. This may be due to climate pressures, fishing pressure, and competition from hatchery-raised fish. Overall, this results in a significant decrease in the amount of nutrients transported upstream. Only about 5-7% of historic levels of marine-derived nitrogen and phosphorus are available to ecosystems in the U.S. Pacific Northwest due to salmon declines. |
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| 7. Scientists suggest revitalizing the world’s “natural phosphorus pump”. How can this be done?Connectivity between marine, freshwater, and terrestrial ecosystems need to be restored and re-established. This means removing barriers to migration, alleviating fishing pressure, and restoring spawning habitat. Broadly, addressing climate change and lack of genetic diversity is needed.  |
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| **Summary/Reflections** |

Using the space below, summarize the videos and readings IN YOUR OWN WORDS and reflect upon the significance of the introduced concepts and knowledge to you as a learner. Your summary should consist of at least 200 words.