# Management Scenarios – Sensitivity testing - for uplift assessment

## Avoided Conversion – Change in urban land cover (bounded)

Current Condition compared to 2030 probability of urban conversion

We will want to target areas that get significantly worse as the ones most in need of management (opposite of other scenarios)

For urban conversion layer we will calculate the following for the input data:

1. percent of area classified as each land cover class
2. percent upstream areas classified as each land cover area

Nothing else will change

## Increased Buffer – Change in stream length with forest (maximize?)

Current condition compared to Current condition with changes in stream length located within various land covers.

For increase buffer layer we will calculate for each catchment new stream length coverages as follows:

* Total unbufferable stream length– (stream length in forest + stream length in moderate and high intensity urban) = total length NOT available to buffer
* Calculate an increase in forested stream length for each (non-zero) length coverage type in proportion to current length so that total increase in forest (and decrease in other coverages) across coverage types = total length available to buffer

We will not worry about changing the catchment area coverages or upstream coverages because the change in buffer area 30 m width will be small relative to catchment size

We will also not include changes in hydrological features like temperature, velocity and volume that may change with buffer because we cannot estimate these, but we can test the sensitivity of the HUC12s to changes in these features separately (if they are significant for the species in the region), and get a sense of whether management that changes these features are important.

## Sensitivity to hydrologic changes – temperature

Current condition compared to changes in stream temperature variables – across the board 10% decrease in temperature or perhaps it makes more sense to do a 5 degree decrease or something like that?. Should see increase in habitat suitability.

A 3 to 5 degree change in high temps seems to be significant for a variety of species <http://water.epa.gov/type/rsl/monitoring/vms53.cfm>

## Sensitivity to hydrologic changes – velocity

Current condition compared to changes in stream velocity variables – across the board 10% decrease in velocity. Should see an increase in habitat suitability, I think.

(Velocity will affect sediment loading and temperature etc..)

## Sensitivity to hydrological changes – volume

Current condition compared to changes in stream volume variables – across the board 10% decrease in volume. Not sure whether there would be an increase or decrease in habitat suitability.

## Increased Wetland – Change in wetland area (maximize?)

Current condition compared to Current condition with changes in catchment and upstream area classified as wetland (and related changes in other land covers). This would also require changes to flowline length, and area and percentage of riparian zone classified as covers that will change (anything that is not urban).

For increase wetland layer we will calculate for each catchment, new catchment and upstream coverages as well as flowline and riprian zone coverages as follows:

* Total area of potential wetland (for each catchment) = [Area that has hydric soils that is not already wetland or moderate to high intensity urban]
* Increase area of catchment, flowline, and riparian zone to the maximum possible wetland area, and decrease other coverages to compensate.
* For maximum wetland scenario percent upstream areas classified as each land cover area

## Dam Removal (sensitivity test, maximize?)

Current condition compared to Current condition with dam(s) removed changing distance to nearest downstream and upstream dam.

I wonder if we could do this as a sensitivity test where we increase distance to nearest dam (Upstream and downstream) by some set percentage (e.g., 25%) just to see which catchments would have the largest changes in habitat suitability from a 25% change in these distances– maybe this would tell us which dams (in which catchment) would be most valuable to remove. Would that work? Or is this measure more likely to be a threshold thing…

Another approach would be (to remove all small dams) to have a scenario where we remove all dams in the small streams in each catchment and recalculate distance to nearest dam up and down stream and see which HUC 12s increase most in habitat suitability.

Either of these make any sense?

## Nutrient Reduction (sensitivity test)

Current condition compared to current condition with 10 % less nutrient inputs.

In each catchment reduce number of NPDES + number of Animal Ops by 10%.

Is this possible? May have 0 in some catchments and will definitely have less than 10 in others and thus need to go to fractions.