

Appendix 1: Codebook hierarchy, code shorthand, and coding rules.

Code Family: Attributes

Code Meaning & Hierarchy	Code	Rule for Coding
Water		
Water Quantity		
Water Supply Scarcity	WSS	<ul style="list-style-type: none"> • Reference to possibility or actuality of not having enough water. • Includes aquifer shortages, snowpack shortages, or rainfall shortages since these are related to rivers and streams through the water cycle. • Could be either a stated concern about the present or for the future, i.e. “there’s not currently enough water for any additional growth”. • Includes scarcity for environmental purposes. [Note: This usage of WSS was far less common in the data.] • Includes discussion of water conservation, water footprint, etc. (implied scarcity).
Flooding Damage	FD	<ul style="list-style-type: none"> • Reference to damage to infrastructure or land damage from flooding. • Includes flooding damage to farms.
Flooding Hazards	FHZ	<ul style="list-style-type: none"> • Flooding-related hazards to humans or domestic animals, reduced access to clean water, increased disease vectors from standing water, physically being carried off by flood, or stranded.
Flooding Other	FO	<ul style="list-style-type: none"> • Any other mention of flooding not associated with Damages (FD) or Hazards (FHZ). • Includes when flooding is referenced as positive in some way. • Includes references to floodplains.
Water Quantity Other	QUANO	<ul style="list-style-type: none"> • Any water quantity reference that doesn’t fit with Scarcity or Flooding. • Includes any general reference to “water quantity”. • Specific flow or volume measurements go here, e.g. acre-feet, cfs. • Includes interest in high flow or low flow or flow timing. But if absence of flow is described as a scarcity issue, use the WSS code. If high flow is described as a flood, use a flooding code.
Water Quality		
Contact Health Risk	CHR	<ul style="list-style-type: none"> • Reference to safety of water contact for human or domestic animals (does not include drinking).
Water Supply Health Risk	WSHR	<ul style="list-style-type: none"> • Reference to safety of water for drinking purposes for human or domestic animals. • Could be from drinking directly from river, or safety of tap water linked to rivers, or safety of eating crops or eating livestock watered with river water. • Includes comments on either water supply safety or lack thereof.
Movement	MVMT	<ul style="list-style-type: none"> • This is meant to capture <u>esthetics</u> of movement or lack of movement. • Appreciative reference to moving water, including calm shimmering surface as well as remarking on spectacles such as waterfalls.

		<ul style="list-style-type: none"> • Includes any positive or negative references to still water, or stagnant water.
Sound	SND	<ul style="list-style-type: none"> • Reference to sound of flowing water.
Swimming Hazards	SHZ	<ul style="list-style-type: none"> • Reference to swimming hazards or lack of swimming hazards, such as currents, cold temperature, or hazards in the river. • If downed trees are mentioned as hazardous to boaters code this as SHZ and TR and NUIS (see later codes). • Can include hazards associated with wading (e.g. fly fishing).
Clarity	CLAR	<ul style="list-style-type: none"> • Any reference to clarity or to non-clarity (murky). • If passage says murkiness is being caused by algae, code VEGO and NUIS as well.
Odor	ODOR	<ul style="list-style-type: none"> • Reference to odor or lack of odor.
Sewage	SEW	<ul style="list-style-type: none"> • Reference to sewage or wastewater when it could have a residential component. • Includes references that can be defensibly linked to sewage/wastewater (e.g. pharmaceuticals flushed down toilets). Do not double-code with RES (unless another part of the quotation triggers RES). Do code IND or AG if there is explicit reference to IND or AG impact on sewage.
Water Quality Other-Specific	QUALSP	<ul style="list-style-type: none"> • A reference to a specific measureable water quality characteristic besides those listed above, such as “dissolved oxygen” or “nutrients” or “eutrophication”. Restricted to inorganic attributes or non-plant/algae/animal attributes.
Water Quality Other	QUALO	<ul style="list-style-type: none"> • Any general reference to “water quality” when no other code above is used.
Fish and Wildlife and Vegetation		
Aquatic Wildlife		
Fish	FISH	<ul style="list-style-type: none"> • Any mention of fish, general or specific. • Does not include a reference to fishing by itself, this is CREC.
Other Aquatic	AQO	<ul style="list-style-type: none"> • Any reference to aquatic animal life besides fish. Includes frogs, amphibians. • Does not include general reference to “wildlife” (that is WLO).
Land Wildlife		
Mammals	MAMM	<ul style="list-style-type: none"> • Appreciation of any mammal wildlife in association with river or stream ecosystems, either particular mammals or mention of “mammals” in general.
Birds	BRD	<ul style="list-style-type: none"> • Any mention of bird wildlife in association with river or stream ecosystems, either particular birds or “birds” in general. • Includes birdsong references.
Other Wildlife		
Other Wildlife	WLO	<ul style="list-style-type: none"> • Any other reference to land wildlife, i.e. reptiles like lizards, insects like butterflies. Includes mention of animal “sign” or tracks. • Includes any unspecific reference to “wildlife” or “animals” or “fauna” of the river.

Vegetation		
Trees	TR	<ul style="list-style-type: none"> • Any mention of trees or forest in particular, including shade, tree type, tree size or height, old growth. • Includes mention of logging, in either positive or negative sense. Logging would also be coded as IND. • Includes references to wood in channel (independent from navigability issues).
Other Vegetation	VEGO	<ul style="list-style-type: none"> • Any other reference to vegetation either specific or unspecific. References to “plants” or “brush” or edible berries etc. all go here. • No domesticated plants, like crops. However, naturalized (growing wild) plants would be coded. • Includes references to algae.
Overarching Codes for Fish, Wildlife, Vegetation		
Pristine, Untouched	PRIS	<ul style="list-style-type: none"> • Pristine, remote, untouched, wild, wilderness; something is valued because of these qualities. To warrant a PRIS code it has to be something besides a reference to “natural”. Distinct from SUPP code. • Something with “wilderness” in the name is not sufficient, the passage has to have something about the idea or quality of wilderness, e.g. the ideas listed above.
Unusual, Unique	UNUS	<ul style="list-style-type: none"> • Something described as unusual or unique or rare. Not just “special”; uniqueness is only one type of specialness.
Endangered Species	ENDG	<ul style="list-style-type: none"> • Any reference to endangered, threatened, at-risk, or extinct species.
Sensitive Species	SENS	<ul style="list-style-type: none"> • Not an endangered species issue: an issue of physiological changes, i.e. mutations such as with frogs; lesions on fish; a disproportionate number of females of a given species.
Native species	NSPEC	<ul style="list-style-type: none"> • Any reference to native or invasive or non-native or stocked or hatchery species. • For example “stocked fish” would be coded FISH and NSPEC.
Biodiversity	BIOD	<ul style="list-style-type: none"> • Mention of biodiversity or diversity or richness.
Nuisance	NUIS	<ul style="list-style-type: none"> • Mention of a plant or animal in context as a <u>nuisance</u> or a <u>danger</u> for any reason, except invasiveness which is covered by the NSPEC code above. Examples are mussels that clog machinery, briars that hurt passersby. • Also code the plant or animal code that is causing the nuisance, e.g. clogging mussels are coded NUIS and AQO.
Channel		
Safety of Navigation	SNAV	<ul style="list-style-type: none"> • Not necessarily a reference to danger: any reference to navigability for commercial or for recreational purposes, such as currents, class of whitewater, depth, shoals, rocks in context of important features for navigation. • Do not automatically code SNAV along with mention of boating (CREC) unless navigation issues are also discussed.
Rocks	ROK	<ul style="list-style-type: none"> • Any reference to <u>natural</u> rocks on bank or in channel not related to navigation, i.e. many people skip rocks or collect rocks along rivers,

		<p>or enjoy seeing rock formations visible from or near rivers.</p> <ul style="list-style-type: none"> • Includes rocks mentioned as a means to an end, such as rock outcrops provide habitat for fish.
Channel or Watershed Statistics	LAREA	<ul style="list-style-type: none"> • River or watershed quantified statistics on length, distance, or area. Such as the numeric size of the watershed or the numeric distance of the river reach. • Includes quantified statistics on lengths, distances, or area of sections. • Does not include volume, which is QUANO.
Human		
Access	ACC	<ul style="list-style-type: none"> • Interest in where is there legal OR physical public access to river areas, or access to the water's edge itself. • Commonly comes up in sense of there NOT being sufficient access. For example, there are no public river parks near the Bronx. Or you cannot kayak in Yellowstone. Or, there is a seawall in Portland, so you can't get down to the water. • Includes when the point is to express that a place is 'highly accessible'. • Could also be in the sense of not wanting people to illegally access the river, to protect private property rights. • Includes protecting private access or limiting access.
Negative Infrastructure	NEGINF	<ul style="list-style-type: none"> • <u>Ugly</u> human infrastructure or modifications to bank or channel. Be sure things are described as ugly, not just your reaction. • Includes references to appreciating that you cannot see any human infrastructure or evidence of man.
Recreation Amenities	RECAM	<ul style="list-style-type: none"> • Positive or neutral reference to existing or desired recreation amenity infrastructure including paths or trails, access roadway, a waterfront park, signage, bathrooms, parking, safety features. If something is mentioned in sense of overdeveloped it would go in NEGINF. • All RECAM are access issues in a sense. Do not double-code with ACC unless the paragraph is also stressing an access issue.
Maintenance of Area	CARE	<ul style="list-style-type: none"> • Reference to something well-maintained OR not well-maintained. Litter, garbage, dilapidation go here. Graffiti or tagging goes here unless described as a purposeful artistic component. • Does not include something only referenced as "outdated" or "obsolete" • NOTE that we are under the "built environment" i.e. the HUMAN subcategory of codes. Maintenance is distinct from intended purpose or design or operations. For example, 'careful' management for environmental purposes is not the CARE code.

Other Users	USENEG	<ul style="list-style-type: none"> • Meant to cover fleeting impacts that only matter to other onsite humans. Does not cover lasting impacts like infrastructure or litter or ecosystem impacts, there are other codes for these issues. • Examples: negative reference to other onsite users, such as overcrowded, or potential safety from dangerous onsite users, or noise from loud boats or partyers. Double code with type of recreational use being described. • Includes references to wanting solitude such as wanting not to even see other users or other rec or commercial boats.
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Code Family: Motivations

Code Meaning & Hierarchy	Code	Rule for Coding
Consumptive Use		
Agricultural	AG	<ul style="list-style-type: none"> • Any reference to land-based agricultural use of rivers/streams, including agricultural pollution.
Industrial & Commercial	IND	<ul style="list-style-type: none"> • Any reference to industrial use of rivers/streams (besides Ag), including commercial transport, commercial fishing, guided fishing, fish farming, water for industrial processes, includes reference to industrial pollution. • Includes hydroelectricity. • Includes forestry, timberlands references. • Includes reference to economic impacts.
Residential	RES	<ul style="list-style-type: none"> • Any reference to residential, municipal, or domestic use of rivers/streams for water supply or discharge. • A dam being built to provide a source of drinking water would be coded RES not IND.
Tribal	TRIB	<ul style="list-style-type: none"> • Any reference to indigenous or tribal or native people.
Hunting or Gathering	HUNT	<ul style="list-style-type: none"> • Any reference to hunting anything along rivers and streams, including animals, edible plants, or plants for crafts or boat-based. • Also code what is being hunted, such as VEGO or MAMM or BRD.
Medicinal Discoveries	MED	<ul style="list-style-type: none"> • Preserve river and stream areas for medicinal benefits, known or speculated from specific types of plants or animals.
Non-Consumptive Use		
Water Contact Recreation	CREC	<ul style="list-style-type: none"> • Any reference to boating, swimming, wading, fishing along rivers and streams. • If a passage implies commercial fishing, do not code CREC. • If a passage refers to commercial fishing guide (recreational fishing) services this gets coded as both CREC and IND.
Passive Outdoor Recreation	PREC	<ul style="list-style-type: none"> • Any reference to hiking, birdwatching, biking walking, viewing, camping, or any unspecified tourism along rivers and streams. Anything here could become CREC if contact with water is mentioned.

		<ul style="list-style-type: none"> • Any unspecified “tourism” or “recreational use” is PREC by default.
Mental or Emotional Health	MENTAL	<ul style="list-style-type: none"> • Not just exercise – this stresses mental or emotional health. • Includes a desire to connect with nature. • Meditation, spirituality, inspiration, de-stressing.
Not Use Contingent		
Preserve for Future	PRES	<ul style="list-style-type: none"> • Wanting to preserve or conserve something ecological, such as for future generations. A reference to preservation or to keeping something for the future is needed for this code.
Rights of Species	RIGHT	<ul style="list-style-type: none"> • Right of a species, or any other anthropomorphized natural thing to exist. It has as much right to exist as we do.
Nature’s Balance	NBAL	<ul style="list-style-type: none"> • Everything has a purpose in the natural world. • A disruption will reverberate through the natural system and affect other natural features and/or humans. • These passages need to demonstrate an understanding of the interconnections of nature or how nature supports humans. Something like “this river is overfished” is not an extensive enough example of interconnections to qualify for this code. Cascading impacts do qualify. • Can come up with unintended consequences of introducing new species that end up taking over; double code with NSPEC. • Can come up with wanting to keep things “natural” to avoid unknown consequences on humans if nature is degraded, double code with SUPP. • Includes abstract statements that things are connected to each other, affecting each other. • Not meant to capture specifically named one-off impacts, such as less water means less fish. But less water means less fish means less birds would qualify. Cascading impacts.
Human Greed or Overuse	GREED	<ul style="list-style-type: none"> • Reference to <u>ecological</u> problems being created by human needs that are unfair or greedy. • Reference to excessive consumption or excessive environmental or carbon footprints go here. • <u>The key is that the passage conveys a sense of judgment.</u> • Does not cover issues between humans, i.e. the haves & have-nots.
Education	EDUC	<ul style="list-style-type: none"> • Interest in educating others or interest in learning about any aspect of rivers and streams, including water conservation and water footprint. • Formal or informal education. Informally instilling values in children still goes here. But not just any reference to kids swimming or whatever, that is just another example of CREC.
Supposed to Be	SUPP	<ul style="list-style-type: none"> • Explicit interest specifically in these ecological contexts: wanting to keep, maintain, or restore what is “supposed to be”; OR what is “natural”. “Supposed to be” is in this case a reference to naturalness as a preferred condition. • For example, restoring to previous conditions, or referring to historic

		<p>conditions or status, or that things are getting worse from what they used to be.</p> <ul style="list-style-type: none"> • Does not include just a reference that things are getting “worse” or “better”. Has to be somehow compared to how things were or should naturally be. • Includes an explicit reference that historic conditions should NOT be the goal of river and stream conditions. For example, “there used to be a lot of downed trees in the Willamette, which made it really dangerous for boaters”, this would be coded SUPP and SNAV. [Note: there were no occurrences of SUPP in this latter sense.]
Self-Sustaining	SELFS	<ul style="list-style-type: none"> • Explicit interest in what ecosystem features could be self-sustaining, i.e. without a lot of human intervention. For example someone may mention invasive fish as preferable because they don’t require restocking. This passage would be coded FISH, NSPEC, and SELFS. • Reference to an impediment to self-sustaining also qualifies. • Reference to water depletion solely in context to human use does not fall under this category. This must include an ecological attribute. • Be careful of “Sustainability” references which may or may not fit here. “Sustainability” all by itself might be too vague to fit anywhere.

Code Family: Other

Code Meaning & Hierarchy	Code	Rule for Coding
No code present in paragraph	NOCODE	<ul style="list-style-type: none"> • Code applied to any paragraph that was not coded with any other codes.