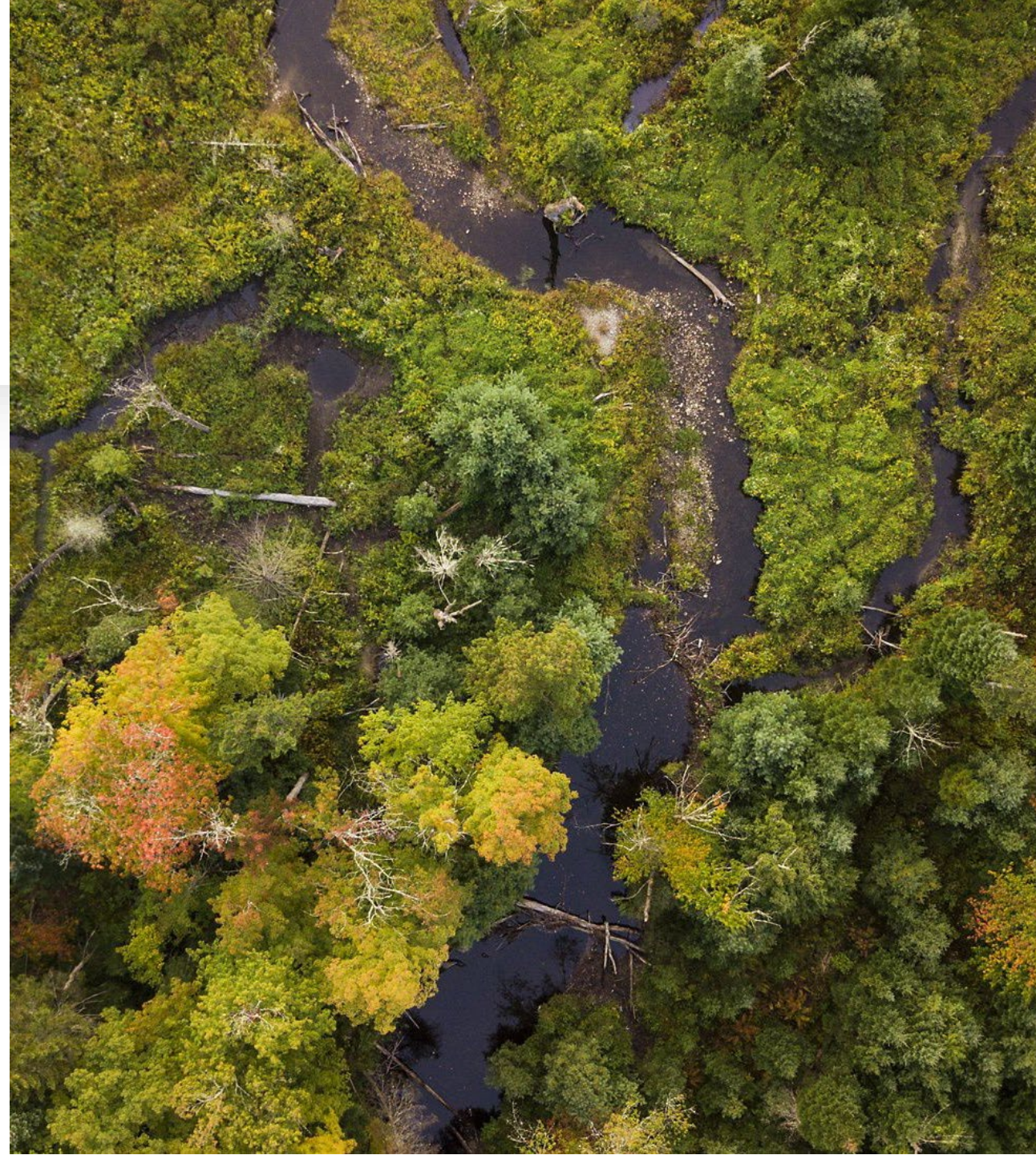


Aquatic Systems Working Group

Members

- Mike Kline, co-chair, *“retired” river scientist*
- Lauren Oates, co-chair, *The Nature Conservancy*
- Emily Alger, *South Hero Land Trust*
- Kassia Randzio, *Vermont River Conservancy*
- Will Eldridge, *VT DFW*
- Shannon Pytlik, *VT DEC*
- Chris Company, *Windham Regional Commission*
- Allaire Diamond, *Vermont Land Trust*
- Michael Fernandez, *Bennington County Conservation District*
- Beverley Wemple, *University of Vermont*



Act 59 – Aquatic Systems Inventory

¹
(6) A review of how aquatic systems are currently conserved or
²
otherwise protected in the State, including a description of the benefits land
³
conservation provides for aquatic systems, whether this is sufficient to
⁴
maintain aquatic system functions and services, and how the implementation
methods for achieving the goals of this chapter using Vermont Conservation
Design as a guide would include specific strategies for protecting aquatic
system health.

Our Process:

Aquatic Working Group (VCSI)

inventory process roadmap

Tasks, per Act 59:

- a) Consensus Definitions
- b) Measurement/Assessment of Aquatic Systems
- c) Review existing programs/regulations/etc. inventory
- d) Land conservation role in aquatic system health
- e) Address “sufficiency”
- f) Existing/new programs needed
- g) Assessment of existing funding and recommendations for new funding
- h) Equity assessment
- i) Other/more?
- j) Report writing/submittal

Task	Meeting #	“Homework”
a-b	1	*read ahead materials sent
b-c	2	*WG members prepare brief review of programs that aim to protect aquatic systems (individually contacted via email)
d-e	3	*review read ahead materials
<i>opening listening session</i>	4	*liaise to respective groups to invite to listening session
review work to-date	5	*review read ahead
f-g-h	6	*tbd
j	7*	*tbd
j, cont'd	8*	*edits from WG due ahead of final meeting

Consensus Definitions as Foundational

- What are “natural forms and functions” AND what services/values do healthy aquatic systems provide?

(4) “Conversion” means a fundamental change in natural ecosystem type or habitat, natural or undeveloped land cover type, or natural form and function of aquatic systems.

“Natural Forms & Functions”

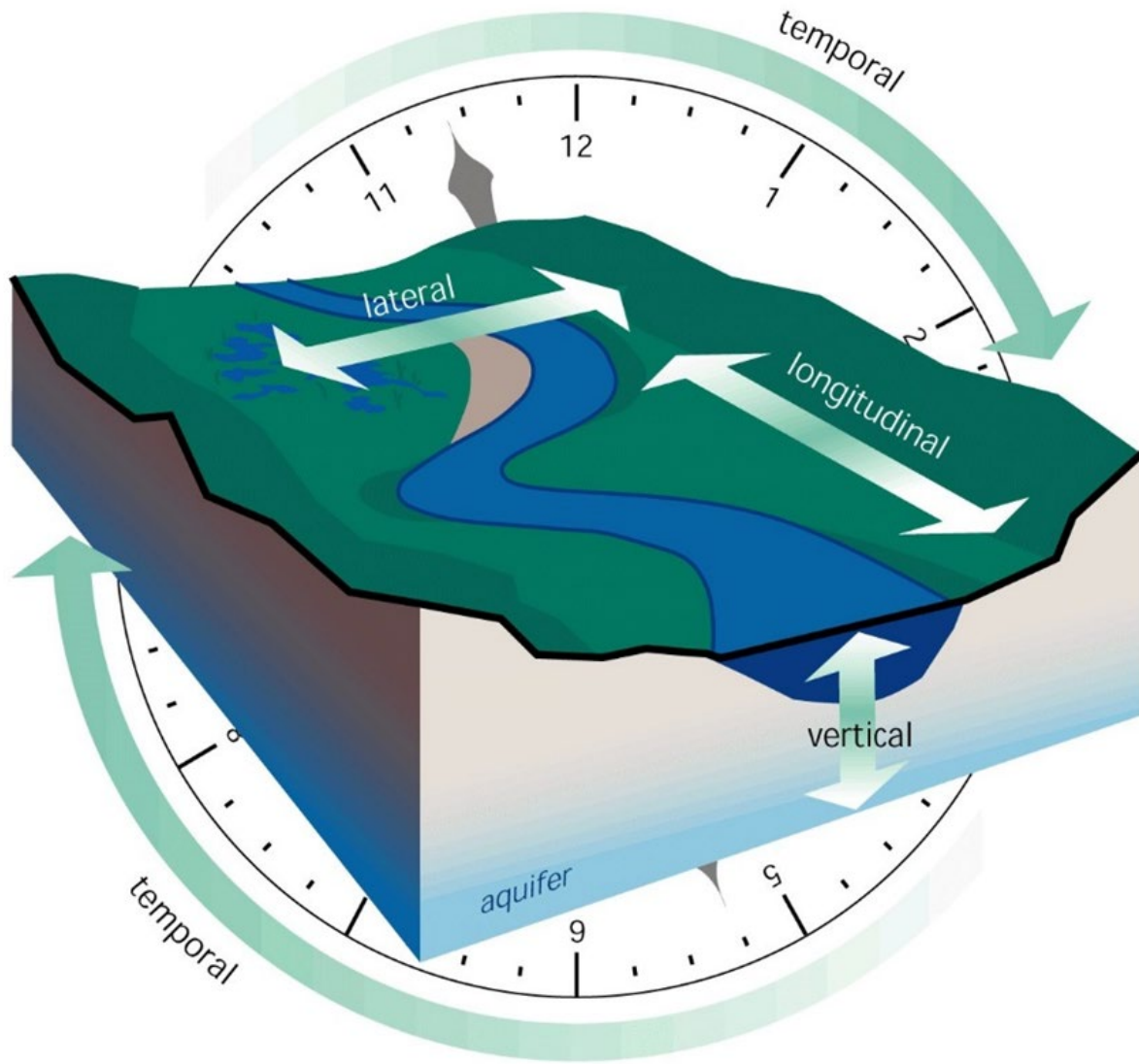


A naturally-occurring aquatic system consists of surface water and groundwater, and their interfaces, including streams, rivers, lakes, ponds, wetlands, floodplains, and riparian areas.

Aquatic systems, as defined above, are hydrologically and/or vegetatively connected (laterally, vertically, longitudinally, and temporally).

Aquatic systems in their natural forms are able to naturally function by exhibiting natural stream, lake, wetland, and soil processes to create and maintain aquatic and riparian habitat supporting the highest natural biodiversity and climate resilience potential.

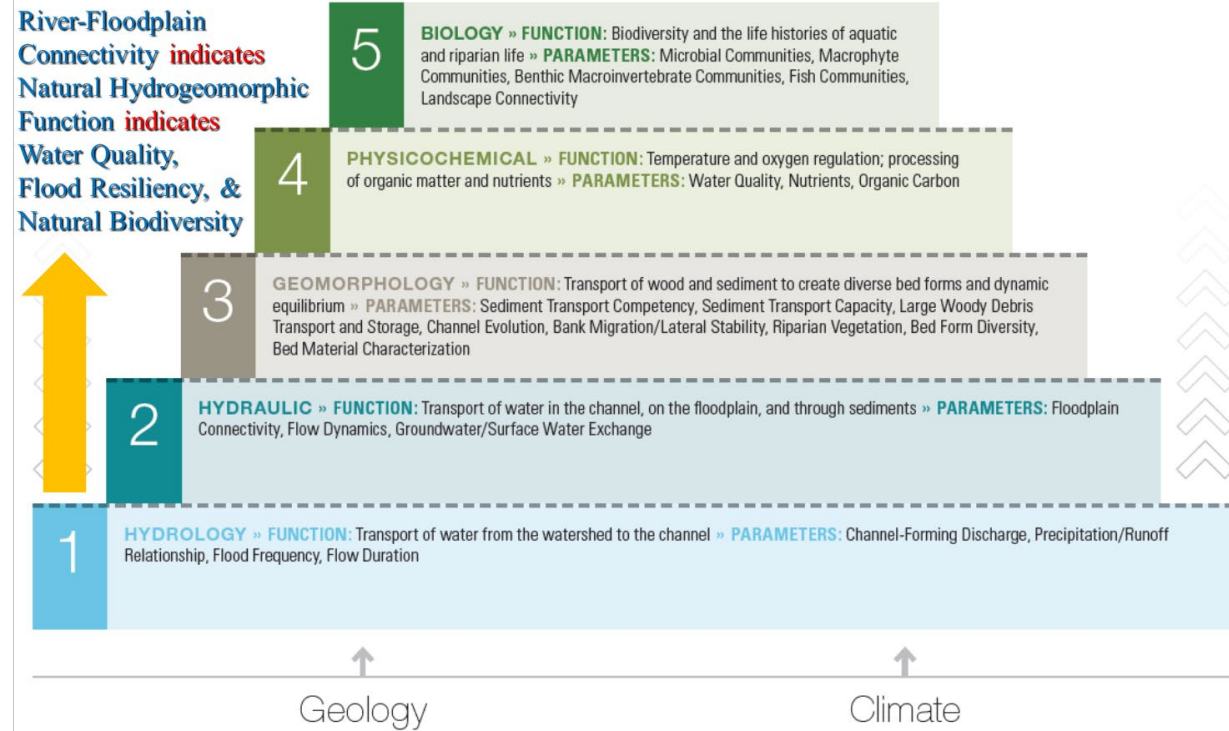
Connectivity as Key



Dimensions of the stream corridor. A four-dimensional framework serves as a good starting point for examining stream corridors.
 In *Stream Corridor Restoration: Principles, Processes, and Practices*, 10/98.
 Interagency Stream Restoration Working Group (FISRWG)(15 Federal agencies of the US).

Stream Functions Pyramid

A Guide for Assessing & Restoring Stream Functions » FUNCTIONS & PARAMETERS



Values & Services

- **Water quality** – natural forms and functions store and distribute sediment, organic matter, and nutrients within the system to the benefit of water supplies, contact recreation, and ecosystem health.
- **Flood and drought resilience** – natural forms and functions maximize groundwater recharge for base flows and distribute water storage throughout the watershed, such that damages to natural and human communities are minimized during floods and droughts.
- **Biodiversity** – natural forms and functions create and maintain diverse and connected habitat mosaics with temperature refugia, and cover (resting and feeding) and reproductive habitats that support a community of organisms with natural species composition, diversity, and functional organization.
- **Carbon sequestration & storage** - natural forms and functions sequester and store carbon in the vegetation, soils, and sediments that build up over time, supporting a balanced carbon cycle through the removal of excess carbon in the atmosphere.
- **Cultural/non-material value** - waterways and their functions are central to nonmaterial values such as sense of place, spiritual fulfillment, aesthetic appreciation, and cultural identity, including a strong sense of stewardship and mutual care.

Programs & Practices Inventory

“how aquatic systems are currently conserved or otherwise protected”

- Inventory the existing programs (funding and regulatory) and practices that support aquatic systems health
- Identify those that fall under “land conservation”
- Gaps/Opportunities analysis
 - what’s working
 - what could be improved
 - what’s missing altogether

Inventory of Existing Programs and Practices

VCSII Aquatic Working Group - Programs & Practices Inventory														
Programs, Regulations, Practices, etc.	Description including statewide footprint and relative project size	Funding Sources	Resource Impacted?	Land Conservation	LATERAL	VERTICAL	LONGITUDINAL	TEMPORAL	Water quality protection	Flood and drought resilience	Biodiversity	Carbon	Cultural & Gaps	
Protect Existing Connectivity and Function														
River corridor easements w-channel mgmt cond	In Perpetuity easement - small state footprint / small project size. Tools include river meander, riparian/wetland specific protections, and easement purposes that guide stewardship	CWF	Lower Valley Riv, FP, Wetlands	Yes	H	H	H	H	High - Sed / Nutr / Temp / Flow / Hab criteria	V. High - Flood & FEH mitigation, drought resil.	High	High	<p>Gap: Need to diversify funding sources to not be tied to P reduction and CWSF process which would be more cumbersome for land trusts and DEC staff. Would provide very high degree of connectivity and services but application is currently very limited (few land trusts using these easements, limited land trust expertise in RCEs); Primarily funded by DEC (prioritizing parcels with physical restoration potential and/or development or agricultural presence) or VMCB (prioritizing recreation, require acquisition, there are parcels with high value for biodiversity, connectivity, flood resilience that don't meet DEC or VMCB priorities so are missed opportunities, VMCB requires parcels to be acquisitions (not continued private ownership), some landowners with high quality river corridors are interested in a river corridor easement but not selling property; 50' buffer has been typical, this should be the minimum in order to make RCEs attractive to as many landowners as possible, state/funders should support maximum buffer (even 300 or 500 feet) when landowner is amenable and it makes sense for size; Not enough public/owner awareness of this program (entire recommendations of potential RCEs via state employ but would be beneficial for more state employees/partners to know about and recommend RCEs as a tool); Challenging to implement at scale because private land is generally fragmented, so challenging to get multiple adjacent landowners to</p>	
Forever Wild easements	In Perpetuity easement - small state footprint / mod. - lg. project size		Headwaters	Yes	VH	VH	VH	VH	High - Sed / Nutr / Temp / Flow / Hab criteria	V. High - Flood & FEH mitigation, drought resil.	High	High	Moderate	<p>Gap: There's been extremely limited state funds going to these easements even though they provide among the highest aquatic and biodiversity resource protections; Opportunity for VMCB to fund Forever Wild easements, potentially via a special Ecological Reserves fund that prioritizes biodiversity/aquatic resources conservation and doesn't compete with farmland/recreation conservation projects for funding (and within these areas, maximize biodiversity/aquatic resources conservation by prohibiting trapping and predator hunting); Vermont Conservation Design suggests about 10% of Vermont should be under forever wild or Wilderness type status, but only 3% is currently, representing one of the biggest gaps to meeting the 30x30 and 50x50 goals; Very few land trusts are using these types of easements (prioritizing state VMCB fund will encourage more land trusts to protect land in this way); Scale is challenging when private property ownership is large smaller parcels, so relies on very large landowners (often timber companies) or multiple adjacent landowners to all buy-in</p>
Home Buyout Program (FEMA-DEM)	Muni land ownership - small state footprint / v. small project size	FEMA, FRCS, occasin	Lower Valley Rivers, Floodplains	Yes	H	M	M	M	High - Sed / Nutr / Temp / Hab criteria	V. High - Flood & FEH mitigation, drought resil.	Low	Low	Moderate	<p>Gap - Buyouts have deed restrictions preventing development, but do not require a buffer or restrict channel management Currently not prioritized for floodplain restoration potential.</p>
Wetland Reserve Program (NRCS)	Landowner contract - mod. state footprint / small project size		Lower Valley Wetlands, FP	Yes	H	M	M	M	High - Sed / Nutr / Temp / Flow / Hab criteria	V. High - Flood & FEH mitigation, drought resil.	Very High	High		<p>Gap - high acreage requirement means this program isn't available to many landowners</p>
Emergency Watershed Protection Prog (NRCS)	Muni land ownership - v. small state footprint / small project size		Lower Valley Rivers, Floodplains	Yes	H	H	M	M	High - Sed / Nutr / Temp / Hab criteria	V. High - Flood & FEH mitigation, drought resil.	Moderate			
Land Conservation - NGO - Farm easement	In Perpetuity easement - mod.lg. state footprint / mod. project size. Tools include riparian/wetland	VMCB	Lower Valley Riv, FP, Wetlands	Yes	H	M	M	M	High - Sed / Nutr / Temp / Hab criteria	High - Flood & FEH mitigation, drought resil.	Moderate		Moderate	<p>Gap: funding for wetland retirement from agriculture. Older easements less likely to have water-specific special protect</p>
Land Conservation - NGO - Forest easement	In perpetuity easement - mod.lg. state footprint / large proj. size. Tools include riparian/wetland	VMCB, private sources	Primarily headwaters and wetland	Yes	H	H	H	H	High - Sed / Nutr / Temp / Flow / Hab criteria	High - Flood & FEH mitigation, drought resil.	High	Mod/High		<p>Gap: watershed restoration practices (ex. forest road stream crossings or other AMP practices) could occur at scale under</p>
Land Conservation - NGO - Forest ownership	NGO land ownership - sm.-mod. state footprint / large proj. size. Tools include riparian/wetland specific protections, and easement purposes that guide stewardship. Forest management requires a management plan.	Private or internal	Primarily headwaters and wetland	Yes	H	H	H	H	High - Sed / Nutr / Temp / Flow / Hab criteria	High - Flood & FEH mitigation, drought resil.	High	Mod/High		<p>Gap: watershed restoration practices (ex. forest road stream crossings or other AMP practices) could occur at scale under ownership, but funding/capacity is limited</p>
Federal Lands - USFS/USACE/NPS	Fed land ownership - v. large state footprint / mod.-large proj. size		Headwaters/Some DV waters	Yes	M	M	M	M	Mod. - Sed / Nutr / Temp / Hab criteria	High - Flood & FEH mitigation, drought resil.	High			
USFS Designated Wilderness	Federal land ownership - mod. state footprint / large project size		Headwaters	Yes	VH	VH	VH	VH	High - Sed / Nutr / Temp / Flow / Hab criteria	High - Flood & FEH mitigation, drought resil.	High	High		<p>Gap: Vermont Conservation Design suggests about 10% of Vermont should be under forever wild or Wilderness type stat; only 3% is currently, representing one of the biggest gaps to meeting the 30x30 and 50x50 goals; Used for a very limited # of federal public lands and unlike many states hasn't been expanded in decades (could be increased via federal legislation supported by Vermont resource conservation leaders and elected officials); Only used as a tool on Green Mountain National Forest, could also be applied to National Wildlife Refuges.</p>
USFS National Recreation Area	Federal land ownership - v. small state footprint / sm. project size		Headwaters	Yes	M	M	M	M	Mod. - Sed / Nutr / Temp / Hab criteria	Mod. - Flood & FEH mitigation, drought resil.	Moderate	Mod		<p>Gap: Congressional legislation states that it protects 22,000+ acres for the purpose of preserving and protecting "existing wilderness and wild values and to promote wild forest and aquatic habitat for wildlife, watershed protection, opportunities primitive and semi-primitive recreation, and scenic, ecological, and scientific values," but in practice USFS management includes road building and timber harvest, so not fully meeting its Congressional mandate and falling short in its aquatic resource conservation potential.</p>
National Wildlife Refuge - USFWS	Federal land ownership - mod. state footprint / large project size	Primarily congression	All	Yes	H	M	H	M	Mod. - Sed / Nutr / Temp / Hab criteria	Mod. - Flood & FEH mitigation, drought resil.	High	High		<p>Gap: expansion of Contie NWR is limited after Sen. Leahy's departure (he was deeply invested in and motivated to funnel into Contie)</p>
Forest Legacy Easements (held by state on private land or over muni lands)	In perpetuity easement - mod./lg. state footprint / large project size	Forest Legacy Program	All	Yes	M	M	M	M	Mod. - Sed / Nutr / Temp / Hab criteria	Mod. - Flood & FEH mitigation, drought resil.	Moderate	Mod		<p>Gap: state could strengthen language in the easement with regards to wetlands and stream buffers, but have preferred to those towards management plans</p>
Healthy Forest Reserve Program	In perpetuity easement - small state footprint	RCPP, FRFP	All	Yes	M	M	M	M	Mod. - Sed / Nutr / Temp / Hab criteria	Mod. - Flood & FEH mitigation, drought resil.	High	Mod		<p>Opportunity: \$\$\$ available through RCPP - the Gap: tough to find right property/landowner willing to accept the easement focuses on restoration of habitat for T&E species.</p>
State Lands - Dept of Forest, Parks & Recreation	State land ownership - may have NGO easement - large state footprint / mod. - lg. project size		All	Yes	M	M	M	M	Mod. - Sed / Nutr / Temp / Flow / Hab criteria	Mod. - Flood & FEH mitigation, drought resil.	High			<p>Gap - management dependant on state land management policy and land managers</p>
State Lands - Dept of Fish & Wildlife	State land ownership - may have NGO easement - mod. - lg. state footprint / mod. project size		All	Yes	M	M	M	H	High - Sed / Nutr / Temp / Flow / Hab criteria	High - Flood & FEH mitigation, drought resil.	High			<p>Gap - dependant on state land management policy and land managers - for example the mowing of wetlands to maintain grassland bird habitat is a point of contention in what is best for management of the resource</p>
State FFR Natural Area, Highly Sensitive Mgmt Area	State land ownership - sm.-mod. state footprint / sm. - lg. proj. size		All	Yes	H	H	H	M	High - Sed / Nutr / Temp / Flow / Hab criteria	High - Flood & FEH mitigation, drought resil.	Very High			<p>Gap - limited use, not permanent/subject to change.</p>
Municipal Lands	Muni land ownership - may have NGO easement-mod. - lg. state footprint / mod. project size		All	Yes	M	M	M	M	Mod. - Sed / Nutr / Temp / Flow / Hab criteria	Mod. - Flood & FEH mitigation, drought resil.	Moderate			
Other types of conservation easements?														
NRCS/AAPM CREP & EQIP	Landowner contract, easements usually sunset		All	Yes										<p>Gap - CREP contracts expire after 15-30 years they are not permanent and once the contract is over the trees can be cut.</p>
DEM - FRFC & FEMA	Private land - small state footprint.	FEMA/FRFC	Potential for all; focus on DV waters	Yes	H	M	M	M	High - Sed / Nutr / Temp / Hab criteria	V. High - Flood & FEH mitigation, drought resil.	Low	Low	Moderate	<p>Gap - mostly seen as additional buyout funding; Buyouts are protected with a deed restriction which is not permanent; no great enforcement mechanism; Floodplain restoration and/or dam removal practices to improve connectivity and reduce vulnerability is better suited to DEC programs</p>

Insufficiency Rationale

“whether [land conservation] is sufficient to maintain aquatic system functions and services”

- **UNANIMOUS DETERMINATION**: We have determined that land conservation alone, though demonstrably valuable for aquatic systems, is insufficient to maintain the full suite of aquatic system functions and services, as previously defined.
 - Land conservation itself may not restore or protect all aquatic functions.
 - Land conservation is inherently parcel-bounded, whereas aquatic systems are a continuum of interconnected networks.
 - Landowner willingness to achieve voluntary conservation practices that reconnect aquatic systems is insufficient.
 - ...and a few more

“...and how the implementation methods for achieving the goals of this chapter using VCD as a guide would include specific strategies for protecting aquatic systems health.”

