NEW HAMPSHIRE NWI+ DATA DEFINITIONS

The USFWS National Wetlands Inventory (NWI) Program has produced digital wetland data for all of the coterminous United States (48 states), Hawaii, and 35 percent of Alaska. Although these data represent a wealth of information about U.S. wetlands, they lack hydrogeomorphic and other characteristics needed to perform assessments of wetland functions over broad geographic areas. Using geographic information system (GIS) technology and geospatial databases, it is now possible to predict wetland functions for watersheds - a major natural resource planning unit. Recognizing the need to better describe wetlands from the abiotic standpoint the Service developed a set of dichotomous keys for use with NWI data that provides descriptors for landscape position, landform, water flow path, and waterbody type (LLWW descriptors).

Two sets of dichotomous keys (composed of pairs of contrasting statements) are provided – one for wetlands and one for waterbodies. This approach has worked well in producing watershed-based wetland characterizations and preliminary assessments of wetland functions. When the LLWW classifications are added to the standard NWI database, a NWI+ database is created. The combination of NWI and LLWW classifications (the NWI+ database) may be used to: (1) produce a more complete description of wetland and deepwater habitat characteristics for watersheds, (2) predict the likely functions of individual wetlands, and (3) estimate the capacity of an entire suite of wetlands to perform certain functions in a watershed or other geographic area of interest.

LLWW Descriptors[2]:
- **Landscape Position** – the relationship of a wetland to a contiguous waterbody
- **Landform** – the physical shape of the wetland
- **Water Flow Path** – the directional flow of water related to the wetland
- **Waterbody Type** – more descriptive of lakes, ponds, estuaries, rivers, and streams

Attribute[1] Original wetland classification scheme presented in Cowardin, 1979.

ESTUARINE AND MARINE DEEPWATER

ESTUARINE AND MARINE WETLAND

FRESHWATER EMERGENT WETLAND

FRESHWATER FORESTED/SHRUB WETLAND

FRESHWATER POND

LAKE

OTHER

RIVERINE

Coding System for LLWW Descriptors[2,3]

The following is the coding scheme for expanding classification of wetlands and waterbodies beyond typical NWI classifications. When enhancing NWI data, codes should be applied to all mapped wetlands and deepwater habitats (including linears). At a minimum, landscape position (including lotic), landform, and water flow path should be applied to wetlands, and waterbody type and water flow path to waterbodies.

Coding for Wetlands

Wetlands are typically classified by landscape position, landform, and water flow path. Landforms are grouped according to Inland types and Coastal types with the latter referring to tidal wetlands associated with marine and estuarine waters. Use of other descriptors tends to be optional. They would be used for more detailed investigations and characterizations

LANDSCAPE POSITION- describe the location of a wetland relative to a waterbody if present.

ES- Estuarine- along tidal brackish waters

LE- Lentic- basins of lakes and reservoirs

LR- Lotic River- along rivers and subject to overflow

LS- Lotic stream- along streams and subject to overflow

MA- Marine- along the ocean

TE- Terrene- sources of streams or isolated – completely surrounded by upland, or not affected by the aforementioned waters.

LANDSCAPE 2

ESTUARY TYPE

1- Drowned river valley
2- Bar-built estuary
3- River-dominated estuary
4- Rocky headland bay estuary
5- Island protected estuary

LENTIC TYPE

1- Natural deep lake
2- Dammed river/stream valley lake
3- Other dammed lake
4- Deep excavated lake (e.g. quarry lake)
5- Shallow excavated lake (e.g. settling basin; use Pond codes for specific types of excavated lakes if desirable)

LOTIC (RIVER OR STREAM) TYPE

1- Perennial
2- Unknown
3- Ephemeral
4- Intermittent
5- Tidal

LANDSCAPE 3

VT Tech did not produce this level of classification in the dataset, so we can remove this field.

LANDFORM- describes the physical shape of the wetland.

BA- Basin- a depressional wetland
FL- Flat- wetland on a nearly level plain
FP- Floodplain- overflow land along rivers subject to periodic inundation
FR- Fringe- wetland in water, within the banks of a river, or on an estuarine intertidal plain
IL- Island- wetland completely surrounded by water
PT- Peatland- wetlands that arise from peat formations

LANDFORM 2

ba basin
by open bay
fl flat
fr fringe
rv river

WATER FLOW PATH- defines the direction of flow of water associated with the wetlands.

CODE	FLOWPATH	DEFINITION
BO	Bidirectional- nontidal/outflow	Water levels rise and fall with water in an outflow lake
BT	Bidirectional- tidal	
IB	Bidirectional- nontidal/isolated (lake)	
IN	Inflow	Wetlands that only receive water from channelized flow without any outflow
ME	Mesotidal	

OA	Outflow- artificial	Water flows out of the system through a ditch or manmade channel; no direct surface water inflow
OI	Outflow- intermittent	Water flows out of the system periodically usually during the wet season or during and shortly after heavy rains; no direct surface water inflow; typically associated with intermittent streams and groundwater discharge; may be the source of a stream
OU	Outflow	Water flows out of the system year-round; no direct surface water inflow; typically associated with perennial streams, rivers and groundwater discharge; often the source of a stream
PA	Paludified	
TA	Throughflow- artificial	Water enters from a water source above and flows out of the system via a ditch or manmade channel or canal
TB	Bidirectional- nontidal/throughflow	Water levels rise and fall with water in a throughflow lake
TH	Throughflow- perennial	Water flows through the system more or less year-round via a perennial stream; wetlands subject to seasonal overflow
TI	Throughflow- intermittent	Water enters from a water source above and flows out of the system via an intermittent stream; flow usually occurs during the wet season or during and shortly after heavy rains
VR	Vertical flow	

CODES FOR OTHER MODIFIERS

dr	partly drained
ed	freshwater wetland discharging directly into an estuary (formerly “ef”)
hw	headwater
pd	pond

Coding for Waterbodies

Waterbodies can be classified by landscape position (for lakes and ponds), water flow path (for lakes and ponds), estuary hydrologic type (for estuaries), and tidal range types (for estuaries and oceans).

WATERBODY LANDSCAPE TYPES (Included in landscape position attribute)

RV- RIVER

EY- ESTUARY

LK- LAKE

OB- OCEAN

PD- POND

LANDSCAPE 2

RIVER TYPE

1- Perennial
2- Unknown
3- Ephemeral
4- Intermittent

POND

1- Natural
2- Dammed/impounded
3- Excavated
4- Beaver
5- Other artificial

LAKE

1- Natural lake
2- Dammed river valley lake
3- Other dammed lake
4- Deep excavated lake (e.g. quarry lake)
5- Shallow excavated lake (e.g. settling basin)
6- Other artificial lake

ESTUARY

1- Drowned river valley
2- Bar-built estuary
3- River dominated estuary
4- Rocky headland
5- Island protected estuary
6- Shoreline bay estuary
7- Tectonic estuary
8- Fjord estuary
9- Drowned basin estuary

OCEAN

1- Open (fully exposed)
2- Semi-protected oceanic bay
3- Atoll lagoon
4- Other reef-protected waters
5- Fjord

WATER FLOW PATH- defines the direction of flow of water associated with the wetlands and associated waterbodies- use the wetland flow path codes listed above.

LLWW CODE- Concatenate LLWW attributes to form a full description of the wetland (Landscape, Landscape 2, Landform, Landform 2, Water flowpath, and other modifiers).

CORRELATION BETWEEN FUNCTIONS AND WETLAND TYPES (modified from Tiner 2011[4])

CORRELATION BETWEEN FUNCTIONS AND WETLAND TYPES
(October 10, 2014)

Function (code)	Level of Function	Wetland Types
Surface Water Detention (SWD)	High	LEBA (excluding LE5 and LE6 wetlands and wetlands with "K" water regime unless in a reservoir or dammed lake), LEFR (excluding LE5 and LE6 wetlands and wetlands with "K" water regime unless in a reservoir or dammed lake), LEFL (only in reservoir or dammed lake: LE2FL and LE3FL; not in impoundments), LEIL (not "A", "D" or "K" water regime), LSBA, LRFPba, LSFR (not "A" water regime), LRFR (not "A" water regime), LRIL (not "A" water regime), PDTH, TEFRpdTH, TEBApdTH, TEBATH, TEBATI, PD2c1, PD2d1, PD2e1, PD3c1, PD3d1, PD3e1
		Note: The high level should not include any wetlands with "A" or "D" (seasonally saturated, formerly mapped as "B" in some places) water regimes with one exception for LEFL in reservoirs or dammed lakes. Does not include areas now classified as LK that were mapped as PUB_ following NWI mapping conventions. Also should not include any LE wetland associated with an artificial freshwater impoundment completely surrounded by estuarine wetland or water, or any vertical flow (isolated) impounded ponds and associated wetlands.
		Special Note: In some regions "B" wetlands include continuously saturated wet meadows and swamps that may be subject to seasonal ponding; they are equivalent to wetlands mapped as "E" in the Northeast and should be rated as High for this function.
	Moderate	LRFPfl, LRFR (other than above), LRPT, LSFL, LSPT, LE1FL, LEIL (other than above, excluding LE5 and LE6 wetlands), LSFR (other than above), TEBA (other than above; excluding vertical flow impounded), PD (other except PD2f , PD2d2, PD2r, PD3d2, PD3f,

		PD3r, and vertical flow impounded ponds), TE__pd (other, excluding slope wetlands TESLpd__), TEFP__, TEFL__ , **Other TEFR (excluding vertical flow that are impounded)**
		Note: Peatlands along rivers and streams are designated as moderate for this function since they may store water in the acrotelm and in depressions during the summer before releasing water to the stream. In some regions of the country (e.g., Prairie Pothole Region), a great abundance of geographically isolated wetlands collectively are very important for temporary water storage but individually they are rated as moderate since they collect water from small areas. When this assessment procedure is applied to that region and similar situations, the predicted function of these wetlands should be re-evaluated by local specialists.
		Caution: This function should not include any tidal wetlands, such as E2___, R1US, R1EM, and P___N, R, S, T and V, as their role in water storage is covered under the Coastal Storm Surge function.
Coastal Storm Surge Detention (CSS)	High	ESBA, ESFR, ESIL, LR5FR, LR5FP, LR5IL, LS5BA, LS5FL, LS5FR, MAFR, MAIL, LE__BT (should exclude diked wetlands and tidal ponds that are impounded and associated tidal wetlands in these categories since the dike prevents storm flowage except during extremes such as hurricanes)
	Moderate	Other tidal wetlands not include above (which includes diked tidal wetlands) and any TE wetland (except SL - slope) or LS1 wetland contiguous with an estuarine wetland (usually marked by "ed" – these are bordering nontidal wetlands subject to infrequent or occasional tidal flooding during storms), TE wetland (except SL – slope) contiguous with marine waters or wetlands (should be marked with "md" or "ow"), TE__tr, TE__td, LS1_td, LS1_tr

	Note: Taking a conservative approach by focusing on lowland wetlands along the estuary and not including similar wetlands in the tidal freshwater reach; also not "ed" wetlands elevated well above the tidal wetland - those having a stream flowing downhill to the estuary or tidal wetland.	
Streamflow Maintenance (SM)		
	High	"hw" wetlands (excluding impounded "h" types)
	Moderate	other "hw" wetlands (impounded "hw" types), LR1FPba (excluding "h" types), LS__BA (excluding "h" and not LS5), TEBAOUds
	Note: While acreage of headwater wetlands may increase due to building ponds in headwater seeps (point features not polygons) and blocking drainageways, these wetlands ("h") do not increase streamflow, yet since they can contribute via overflow and seepage they are rated as moderate for this function.	
Nutrient Transformation (NT)	High	P__(AB, EM, SS, FO and mixes)C, P__(AB, EM, SS, FO and mixes)E, P__(AB, EM, SS, FO and mixes including __/UB and UB/__, etc.)F, P__(AB, EM, SS, FO and mixes)R, P__(AB, EM, SS, FO and mixes)T, P__(AB, EM, SS, FO and mixes)N, P__(AB, EM, SS, FO and mixes)H, P__(AB, EM, SS, FO and mixes)L or V, E2AB, E2EM (and mixes), E2SS (and mixes), E2FO (and mixes), E2RF, M2AB, P__(AB, EM, SS, FO and mixes)Bt (fen) , L2_(AB, EM and mixes)C, L2_(AB, EM, and mixes)E, L2_(AB, EM, and mixes)F, L2_(AB, EM, and mixes)H, L2_(AB,EM, and mixes)N, L2_(AB,EM, and mixes)R, L2_(AB,EM, and mixes)T, L2_(AB, EM, and mixes)V GA coast – Include PFO3B, PSS3B and mixes of the two since they are continously saturated; but not mixes with other types of "B" wetlands (FO1, FO4, EM, etc.).

Note: Taking a conservative approach by focusing on lowland wetlands along the estuary and not including similar wetlands in the tidal freshwater reach; also not "ed" wetlands elevated well above the tidal wetland - those having a stream flowing downhill to the estuary or tidal wetland.

Streamflow Maintenance (SM)		
	High	"hw" wetlands (excluding impounded "h" types)
	Moderate	other "hw" wetlands (impounded "hw" types), LR1FPba (excluding "h" types), LS__BA (excluding "h" and not LS5), TEBAOUds

Note: While acreage of headwater wetlands may increase due to building ponds in headwater seeps (point features not polygons) and blocking drainageways, these wetlands ("h") do not increase streamflow, yet since they can contribute via overflow and seepage they are rated as moderate for this function.

Nutrient Transformation (NT)	High	P__(AB, EM, SS, FO and mixes)C, P__(AB, EM, SS, FO and mixes)E, P__(AB, EM, SS, FO and mixes including __/UB and UB/__, etc.)F, P__(AB, EM, SS, FO and mixes)R, P__(AB, EM, SS, FO and mixes)T, P__(AB, EM, SS, FO and mixes)N, P__(AB, EM, SS, FO and mixes)H, P__(AB, EM, SS, FO and mixes)L or V, E2AB, E2EM (and mixes), E2SS (and mixes), E2FO (and mixes), E2RF, M2AB, P__(AB, EM, SS, FO and mixes)Bt (fen) , L2_(AB, EM and mixes)C, L2_(AB, EM, and mixes)E, L2_(AB, EM, and mixes)F, L2_(AB, EM, and mixes)H, L2_(AB,EM, and mixes)N, L2_(AB,EM, and mixes)R, L2_(AB,EM, and mixes)T, L2_(AB, EM, and mixes)V GA coast – Include PFO3B, PSS3B and mixes of the two since they are continously saturated; but not mixes with other types of "B" wetlands (FO1, FO4, EM, etc.).

		GA coast – Include PFO3B, PSS3B and mixes of the two since they are permanently saturated; but not mixes with other types (FO1, FO4, EM, etc.).
		Note: Bogs and other continuously saturated wetlands and wetlands with organic soils should be rated as high for this function. Exclude AB1, PFO5 and PSS5 from 'High'.
	Moderate	P__ (AB, EM, SS, FO, and mixes)A, P__ (AB, EM, SS, FO, and mixes)D (seasonally saturated; continuously saturated "B" types should be rated as High), **P__ (SS, FO, and mixes)K**, P__ (AB, EM, SS, FO, and mixes)S, E2AB, R_EMA, L2EM_A, E2US (including mixes dominated by nonvegetated class; focus on mudflats and organic flats for purely nonvegetated types and exclude sand flats/beaches and other substrates; not E2US_P), R1US (and mixes dominated by nonvegetated class; focus on mudflats and organic flats for purely nonvegetated types and exclude sand flats/beaches and other substrates), PUB (and mixes; and not PD2 b,c,d,e1,and f or PD3 b,c,d,e1, f and j1; also exclude vertical flow impounded ponds), PUS/vegetated, and L2US/vegetated, L2UB/vegetated, PFO5 (excluding vertical flow and impounded), PSS5 (excluding vertical flow and impounded)
		Note: Mixes for vegetated wetlands are those where vegetation is the dominant class, while mixes for nonvegetated wetlands are those where the substrate is the dominant class. Commercial cranberry bogs – PSSf – and other farmed wetlands P__f are not included; also "mixes" should include nonvegetated wetlands where vegetated types predominate and vegetated wetlands where nonvegetated types predominate. If mapping includes any H, G or V wetlands that are vegetated by vascular plants other than aquatic bed species – not dead trees, they too should be rated as high for this function. Also exclude M2AB1__ and E2AB1__ as these types are typically associated with rocky shores as mapped.
Sediment and Other Particulate Retention (SR)	High	ES__(vegetated and mixes), LEBA, LEFR (vegetated and mixes, not "fm"- floating mat), LEIL (veg and mixes, not "fm"), M2AB3__, LSBA, LRBA, LSFP, LRFP, LRFR (veg, not "fm"), LSFR (veg, not "fm"), LRIL (veg, not "fm"), PDTH, TE__pdTH (including __pq), PDBT, TE__pdBT, TEBATH, TEBATI,

		TEFRpdTH, PD2c1, PD2d1, PD2e1, PD3c1, PD3d1, PD3e1, **PD2r, PD3r**
	Moderate	E2__(US, SB, RF, excluding RS), LEFR (nonveg), LEFL (veg), LSFL (not P___D_), LRIL (nonveg), LRFR (nonveg), LSFR (nonveg), M2US, M2RF, Other TEBA (not P__D_), PD1, PD2 and PD3 (not c, d, e, f, g, j types), PD4, TEFLpd (not P__D_), TEFP__ (not P_B_), TEFL__ (P__A, not P__D_), TE__pdOU, TE__pdIN, Other TEFRpd__
	Note: No "D" (formerly "B") wetlands should be identified as significant for this function; only flooded types: A, C, E, F, H, R, S, T, R, N, M, and L should be rated. This will exclude bogs (PT and "a") but should include fens (possibly PT but lacking an "a") and "B" wetlands on muck soils (e.g., Minnesota and northern Midwest region).	
Bank and Shoreline Stabilization (BSS)	High	E2__(AB, EM, SS, FO and mixes; not IL), E2RS (not ESIL), E2US_P (not ESIL), M2RS(not MAIL), M2AB1N (not IL), LR_(AB, EM, SS, FO and mixes; not LRIL and not "fm"), LS_(AB, EM, SS, FO and mixes and not "fm"), LE__(AB, EM, SS, FO and mixes; not LEIL and not "fm"), R_RS, L2RS
	Moderate	E2US_N or M (not IL), M2US (not IL), TE__pd (AB, EM, SS, FO and mixes), TE__OUhw (AB, EM, SS, FO and mixes), E2RF (when occur along a shoreline), M2RF (when occur along a shoreline), TE__OIhw (AB, EM, SS, FO and mixes)
	Note: Exclude IL wetlands from this function since they are not shoreline features. Be sure to also exclude US and UB wetlands in nontidal areas.	
Fish and Aquatic Invertebrate Habitat (FAIH)		
	High	E2EM (including mixes with other types where EM1 or EM2 predominates; excluding E2EM5P__ and mixes where EM5 predominates

	and mixed communities dominated by E2FO or E2SS), E2US_M, E2US_N, E2RF, E2AB, E2RS/AB, L2_F, L2_H or G, L2AB, L2UB/__(AB, EM, SS, FO), LE__ (vegetated; AB, EM, SS, FO) and NWI water regime = H (permanently flooded), M2AB, M2RS/AB, M2US_M, M2US_N, M2RF; P__F and adjacent to PD (PD1, PD2 a3,b,and h, PD3b and h, and PD4 only), LK, RV (all except LR4), or ST (all except LS4) waters; P__F and __FRsl or __BAsl (slough), PAB (not excavated or impounded), PUB/__(AB, EM, SS, FO), P__(EM, SS, FO)H, PEM__(N,R,T, or L, except EM5), PSS_T, PFO_T, PD (PD1, PD2 a3,b,and h, PD3b and 3h, and PD4 only) associated with P__(AB, EM, SS, FO)F, R1EM, R1AB, R1US(except S), R2AB, R2EM, PD (PD1, PD2a3, 2b, 2h, PD3b, and 3h, and PD4) associated with P__(AB, EM, SS, FO)H

Note: M1AB3L = submerged eelgrass – important habitat but is not wetland so it is not included above; reports will note this. L2__K wetlands were not rated due to unknown management.

Moderate	LE__ and PEM1E (contiguous with waterbody; no mixes), LR__ and PEM1E (ontiguous with waterbody; no mixes), LS__ and PEM1E contiguous with waterbody; no mixes), PEM5F and adjacent to LK, RV (except LR4), or ST(except LS4) waters, E2EM5N (and mixes), PEM5N (and mixes), E2EM5/1P, E2EM5P__ and adjacent to the estuary (and mixes, but not "interior" E2EM5P_), E2FO/EM__ (not EM5), E2SS/EM__ (not EM5), LR5__ and PFO/EM_R or T (not EM5), LS5__ and PFO/EM_R or T (not EM5), LS5__ and PSS/EM_R or T (not EM5), PD (≥ 1 acre in size and PD1, PD2 a, b, h, PD3 a3, b, h, PD2e2, PD2e3, PD2a4, PD2a5, PD2p, PD2p1, PD2p2, PD2q, PD2q 1, PD2q2, PD3a4, PD3a5, PD3e2, PD3e3, PD3p, PD3p1, PD3p2, or PD4), TEFRpd (along these ponds), PAB (impounded or excavated and ≥1 acre and not associated with PD2 c,d,e,f,and g or PD3 c,d,e,f, and g), LR_FPba

Note: Ponds one acre or greater and certain types were selected as moderate. Including PEM1E under Moderate is an attempt to include some marshes that may be classified as "E' wetlands rather than "F". **Exclude wetlands and ponds associated with active dredged material disposal impoundments ("da").**

	Stream Shading (Shade)	LS (not LS4 or not LS__pd) and PFO, LS (not LS4 or not LS_pd) and PSS (not PSS_Ba or not PSSf); excluding FO5 and SS5; TE_OUhw and PFO or PSS (not PSS_Ba or PSSf)
	Locally Significant	Example: Lake Champlain - seasonally flooded LE__ wetlands (important for spring spawning); possibly add LR__ and LS__ wetlands with an E or C (water regime for spawning)

Note: Shrub bogs should be excluded from all the above, e.g., PSS3Ba and commercial bogs = PSSf.

Waterfowl and Waterbird Habitat (WBIRD)	High	E2EM1 or E2EM2 (includes mixes where they predominate), E2EM5N, E2US__ M, N, P, and T water regimes (not S water regime), E2RF, E2AB, E2RS, L2_F (vegetated, AB, EM, SS, FO and mixes with nonvegetated), L2AB (and mixes with nonvegetated), L2US_(F,E, C, R, or T), L2UB_F, L2_H (vegetated, AB, EM, SS, FO and mixes with nonvegetated), M2AB, M2RS (excluding jetties and groins – M2RSPr), M2US, M2RF, P__F and adjacent to PD (PD1, PD2a3, 2h, PD3h, and PD4 only), LK, RV(not LR4) or ST (not LS4) waters or along a slough ("sl" modifier); PAB (not excavated or impounded, except those associated with wildlife impoundment – "wi"), P__T, P__H (vegetated, EM, SS, FO including mixes with UB), PEM1Eh and adjacent to LK, RV(RV1 RV2, RV6b, and RV6c only), ST (ST1 and ST2 only), and certain PD (PD1, PD2a3, 2h, PD3h, and PD4 only), PEM1Eb; PUS_F (not PD3), PUS_E (not PD3), LS__ and PEM1E (including mixes; not LS4), LR__ and PEM1E (including mixes; not LR4), TE__ hw and

	PEM1E (including mixes); LE__ and PEM1E (including mixes); PEM_N (and mixes), PEM__R, (includes mixes, but excludes Phragmites-dominated EM5), P__/EM_N, and P__/EM_R (not EM5), PD2h, PD3h, PD4, PD1 associated with P__(AB, EM, SS, FO)F, PD associated with P___T, PD1 associated with P__(AB, EM, SS, FO)H, PUB__b, R1EM, R_EMF, R1US (except S water regime), TE_pd and PEM1E (including mixes)
Moderate	E2EM5P (and mixes) and contiguous with open water (not "interior" marshes), E2SS1/EM1P6, E2SS1/EM1Ph, E2EM5/1P, PEM5__E,F, R, or T and adjacent to PD, LK, RV(not LR4), or ST(not LS4), other L2UB (not listed as high), Other PD (≥ 1 acre in size and PD1, PD2 a, h, PD3 a, h, or PD4), Other P__F (vegetated wetlands and >1 acre), PAB (impounded or excavated and >1 acre), LS4 and PEM1E (> 1 acre in size), TEBA and PEM1E (> 1 acre in size), other PEM1Eh
Wood Duck	LS(1,2, or 5)BA and P__ (FO or SS and mixes; not PSS3Ba or PSSf – commercial cranberry bog), LS(1,2, or 5)FR and P__ (FO or SS and mixes; not PSS3Ba or PSSf), LR(1,2, or 5)FPba and P__(FO or SS and mixes; not PSS3Ba or PSSf), LRFPba and PUB/FO; PFO_R, T, or L (and mixes) and contiguous with open water, PSS_R, T, or L (and mixes) and contiguous with open water, LEBA and P_(FO or SS and mixes; not PSS3Ba or PSSf) and contiguous with open water, TEBAOUhw and P_(FO or SS and mixes; not PSS3Ba or PSSf)

Note: All waterfowl impoundments and associated wetlands that should be marked with "wi" should be rated as high for this function. Ponds used for aquaculture (2b, 3b) are excluded since management will likely deter use of these ponds; associated wetlands should also be excluded as should wastewater treatment, industrial, and commercial ponds and lakes and associated wetlands. Shrub bogs, e.g., PSS3Ba, commercial bogs = PSSf , and farmed wetlands: P__f should be excluded in Northeast, but check use of farmed wetlands in Prairie Pothole and elsewhere. **Also exclude wetlands and ponds associated with active**

dredged material disposal impoundments. For wood duck, there should be no wetlands along intermittent streams designated as important.

Comment: PEM1C wetlands along waterbodies may also be important for this function in some regions, but in the Northeast these may be wet meadows rather than marshes; these wetlands are recognized as important for "Other Wildlife."

Other Wildlife Habitat (OWH)	High	Any vegetated wetland complex ≥ 20 acres, wetlands 10-20 acres with 2 or more vegetated classes (excluding EM5), certain ponds (PD1a, b, c, d, e, f, h, i, j, k, l, m, n, o, p, q1, q2, q3, q4) , freshwater wetlands (P___ or L2____ and not EM5 - *Phragmites*) on undeveloped portions of barrier islands or beaches, small permanently flooded or semipermanently flooded wetlands (including PUBH and PUBF) within a forested wetland or upland forest (can use specific PD types to identify these), other forested or scrub-shrub wetlands within 100m of these permanently flooded or semipermanently flooded wetlands
	Moderate	Other vegetated wetlands

Note: Vegetated wetlands should focus on EM, SS, and FO; exclude AB from the size determination of a vegetated wetland complex, but include AB mixes with EM, SS, and FO (e.g., AB/FO, EM/AB) except FO5 and SS5. Mixes of subclass (e.g., FO1/4 or SS3/1 do not qualify as a mixed class; a mixed class wetland is comprised of two different classes (e.g., FO/SS, EM/SS). This function requires merging of polygons so that complexes are identified for the acreage determination, then recompile and look within the complex for more than one class or mixed class wetlands for the rating. **Exclude wetlands and ponds associated with dredged material disposal impoundments ("da").**

Unique, Uncommon, or Highly Diverse Wetland Plant Communities (UWPC)

Typically apply this function only where region has designated special types for this function or where this has been done locally.

Regional significant (Northeast U.S.)	E2EM1N, E2EM1P6, R1EM, R1US (only where vegetated in summer), PEM1N, PEM1R, PEM2N, PEM2R, PSS_R, PSS_T, PFO4__g and PSS4__g (Atlantic white cedar; including mixtures), P___t (fens – EM, SS, FO), PFO2__ and PSS2__(bald cypress; DE and MD), E2AB__ (eelgrass and SAV beds-not algae), LS__FR (excluding PFO5 and SS5), LR__FR excluding PFO5), *PD1m (woodland vernal pool), *forested wetlands within >7000-acre forest (limit to Mid-AtlanticRegion and Coastal Plain only), karst ponds and associated wetlands, E2EM1N6, PEM1T Certain coastal wetlands along the Great Lakes (e.g., Presque Isle, PA; will need to be designated on a case-by-case basis)

Note: Exclude any altered wetland – x, h, td, and tr – plus any "d" wetland that is channelized or extensively ditched; also exclude any EM5 wetland or wetland mixed with EM5 unless it is native *Phragmites*. R1US wetlands only where mapped on leaf-off imagery and no summer image was available; otherwise should be mapped as R1EM2 where vegetated in summer with emergents.

Locally significant (case-by-case; Northeast U.S.)	PFO2__ (larch), PSS2__(larch), PSS3Ba or PSS1Ba (and mixes; shrub bog), northern white cedar swamps, hemlock swamps, E2EM1N and P (some areas), LEFR with EM/AB and AB/EM vegetation, other uncommon types in an individual watershed

**Comment*: Can't easily do, would need to hand pick or do additional GIS analysis.

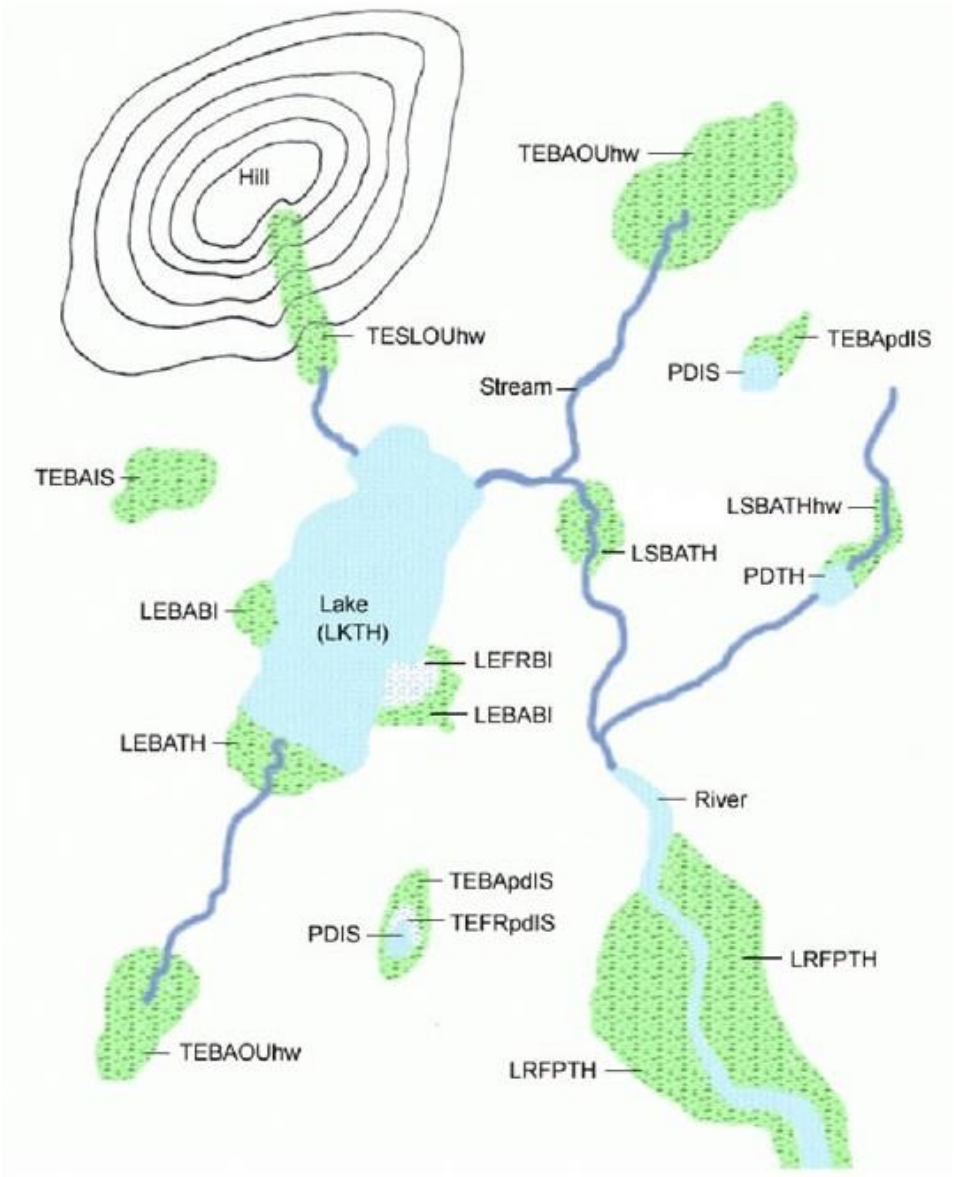

Figure 1. Application of LLWW descriptors to a region with nontidal wetlands. Landscape positions: LR – lotic river, LS – lotic stream, LE – lentic, and TE – terrene; Landforms: BA – basin, FR – fringe, FP – floodplain, SL – Slope; Water flow paths: OU – outflow, IS – isolated, TH – throughflow, BI – bidirectional-nontidal; other descriptors: pd – pond (association), hw – headwater; Waterbodies: PD – pond, LK – lake. Note: Landscape position can be added to lakes and ponds if desirable.

DEFINITIONS

Basin -- a depressional (concave) landform; various types are further defined by the absence of a stream (isolated), by the presence of a stream and its position relative to a wetland (throughflow, outflow, inflow), or by its occurrence on a floodplain (floodplain basins include ox-bows and sloughs, for example)

Bay -- a coastal embayment of variable size and shape that is always opens to the sea through an inlet or other features

Drained, Partly -- condition where a wetland has been ditched or tiled to lower the ground water table, but the area is still wet long enough and often enough to fall within the range of conditions associated with wetland hydrology

Estuarine -- the landscape of estuaries (salt and brackish tidal waterbodies, such as bays and coastal rivers) including associated wetlands, typically occurring in sheltered or protected areas, not exposed to oceanic currents

Estuary -- a complex of saltwater and brackish wetlands and waterbodies subject to periodic inundation by tides; the mixing zone of freshwater and saltwater along the marine coasts; excludes the freshwater tidal reach of coastal rivers following Cowardin et al. (1979)

Flat -- a relatively level landform; may be a component of a floodplain

Floodplain -- a broad, generally flat landform occurring in a landscape shaped by fluvial or riverine processes; for purposes of this classification limited to the broad plain associated with large river systems subject to periodic flooding (e.g., once every 100 years or more often) and typically having alluvial soils; further subdivided into several subcategories: flat (broad, nearly level to gently sloping areas) and basin (depressional features such as oxbows and sloughs)

Fringe -- a wetland occurring along a standing or flowing waterbody, i.e., a lake, pond, river, stream, estuary, or ocean, including tidal wetlands that are inundated frequently by tides, nontidal vegetated wetlands that are flooded for most of the growing season, and nonvegetated wetlands that form the banks of these waterbodies (such as cobble-gravel bars along river bends).

Inflow -- water enters; an inflow wetland is one that receives surface water from a stream or other waterbody or from significant surface or ground water from a wetland or waterbody at a higher elevation and has no significant discharge

Island -- a landform completely surrounded by water and not a delta; some islands are entirely wetland, while others are uplands with or without a fringe wetland

Lake -- an open waterbody greater than 20 acres in size that is completely surrounded by land or wetland and often having an inlet, outlet, or both
Lake, Floodplain – lake embedded in a floodplain, often with only a temporary connection to the river, either by overflow or an intermittently flooded channel; differs from river lake in that connection is more temporary, while the latter maintains its water connection through most of

the year and appears to be part of the river
Lake, River – a semi-enclosed waterbody on floodplain that is directly connected to the river and clearly part of the river; these waters are often named waterbodies on the U.S.G.S. topographic maps

Lake Island -- an island in a lake

Lentic -- the landscape position associated with large, deep standing waterbodies (such as lakes and reservoirs) and contiguous wetlands formed in the lake basin (excludes seasonal and shallow lakes which are included in the *Terrene* landscape position)

Lotic -- the landscape position associated with flowing water systems (such as rivers, creeks, perennial streams, intermittent streams, and similar waterbodies) and contiguous wetlands

Marine -- the landscape position (or seascape) associated with the ocean's shoreline

Outflow -- water exits naturally or through artificial means (e.g., ditches); an outflow wetland has water leaving via a stream, seepage, or ditch (artificial) to a wetland or waterbody at a lower elevation; it lacks an inflowing surface water source like an intermittent or perennial stream

Paludified -- subjected to paludification, the process by which peat moss engulfs terrains of varying elevations due to an excess of water, typically associated with cold, humid climates of northern areas (boreal/arctic regions and fog-shrouded coasts)

Peatland – a wetland landform comprised of an organic deposit usually of peat formed under conditions of nearly continuous saturation, typical of bogs and fens in higher latitudes and mountainous regions

Pond -- a natural or human-made shallow open waterbody that may be subjected to periodic drawdowns and less than 20 acres in size

River Island -- an island within a river

Stream -- a natural drainageway that contains flowing water at least seasonally; different stream types: *perennial* where water flows continously in all years except drought or extremely dry years; intermittent where water flows only seasonally in most years; channelized where stream bed has been excavated or dredged

Terrene -- wetland surrounded or nearly so by uplands and lacking a channelized outlet stream, or if along a stream wetland is not overflowed by stream, thereby serves as a contributing water source for the stream; includes a variety of wetlands and natural and human-made ponds

Throughflow -- water entering and exiting, passing through; a throughflow wetland receives significant surface or ground water which passes through the wetland and is discharged to a stream, wetland or other waterbody at a lower elevation; throughflow may be perennial, intermittent, or associated with an entrenched stream

Tidal Flooding – water levels rise and fall in response to tides; frequent tidal flooding – inundation from tides occurs in most months and is not limited to extreme weather events (e.g., northeasters and hurricanes)

REFERENCES

[1]Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. *Classification of Wetlands and Deepwater Habitats of the United States*. U.S. Fish and Wildlife Service, Washington, DC. FWS/OBS-79/31. http://www.fws.gov/wetlands/Documents/Classification-of-Wetlands-and-Deepwater-Habitats-of-the-United-States.pdf

[2]Tiner, R.W. 2014. *Dichotomous Keys and Mapping Codes for Wetland Landscape Position, Landform, Water Flow Path, and Waterbody Type Descriptors: Version 3.0*. U.S. Fish and Wildlife Service, National Wetlands Inventory Program, Northeast Region, Hadley, MA. 65 pp. plus Appendices.

[3]Tiner, R.W., J. Herman, and L. Roghair. 2013. *Connecticut Wetlands: Characterization and Landscape-level Functional Assessment*. Prepared for the Connecticut Department of Environmental Protection, Hartford, CT. U.S. Fish and Wildlife Service, Northeast Region, Hadley, MA. 45 pp. plus appendices.

[4]Tiner, R.W. 2011. Predicting Wetland Functions at the Landscape Level for Coastal Georgia Using NWIPlus Data. U.S. Fish and Wildlife Service, National Wetlands Inventory Program, Region 5, Hadley, MA. In cooperation with the Georgia Department of Natural Resources, Coastal Resources Division, Brunswick, GA and Atkins North America, Raleigh, NC. 29 pp.