WATER ENVIRONMENT PERMITTING IN THE US AND EU

By David L Russell, PE
President, Global Environmental Operations, Inc.
4642 Warrior Trail, SW, Lilburn, GA, 30047
dlr@mindspring.com

The process of obtaining a discharge permit and operating a facility is substantially different between the US and the EU. Part of the difference is related to regulatory philosophy, and part due to enforcement policy. This article addresses water permitting.

1. PERMITTING IN THE UNITED STATES:

There are two sets of standards for water in the US. The first is for stream and surface water quality standards, and the second is for drinking water standards. National Water Quality Standards for the US are designed to make the waters of the US "fishable and swimmable", and zero discharge of pollutants by 1985. Also In 1972, Congress passed the Marine Protection, Research, and Sanctuaries Act, known as the Ocean Dumping Act, and in 1974 the Safe Drinking Water Act. The EPA was given authority to implement these acts as well.

2. THE CLEAN WATER ACT PL 92-500 AS AMENDED

The 1972 Clean Water Act was amended: in 1977; and in 1981 when Congress passed the Municipal Wastewater Treatment Construction Grants Amendments; and in 1987 with the Water Quality Act. These statutes reaffirmed the federal interest in assuring water quality in the United States, but recognized the difficulty of achieving the goals set forth in the 1972 act within the time period specified. The principal mechanism for regulation is through water quality standards which must be met during the periods of normal low flow, or for 7 consecutive days once in every 10 years. This is the governing low flow for setting water quality standards. The underlying authority for this is Section 303(d-g) of the Clean Water Act.

The States must specify interstate water quality, but that is subject to EPA overview and consent[i]. Quoting from the Clean Water Act:

> *(d)ADMINISTRATOR OF ENVIRONMENTAL PROTECTION AGENCY TO ADMINISTER CHAPTER*
> *Except as otherwise expressly provided in this chapter, the Administrator of the Environmental Protection Agency (hereinafter in this chapter called "Administrator") shall administer this chapter.*
> *(e)PUBLIC PARTICIPATION IN DEVELOPMENT, REVISION, AND ENFORCEMENT OF ANY REGULATION, ETC.*
> *Public participation in the development, revision, and enforcement of any regulation, standard, effluent limitation, plan, or program established by the Administrator or any State under this chapter shall be provided for, encouraged, and assisted by the Administrator and the States. The Administrator, in cooperation with the States, shall develop and publish regulations specifying minimum guidelines for public participation in such processes.*

(f) PROCEDURES UTILIZED FOR IMPLEMENTING CHAPTER

It is the national policy that to the maximum extent possible the procedures utilized for implementing this chapter shall encourage the drastic minimization of paperwork and interagency decision procedures, and the best use of available manpower and funds, so as to prevent needless duplication and unnecessary delays at all levels of government.

(g) AUTHORITY OF STATES OVER WATER

It is the policy of Congress that the authority of each State to allocate quantities of water within its jurisdiction shall not be superseded, abrogated or otherwise impaired by this chapter. It is the further policy of Congress that nothing in this chapter shall be construed to supersede or abrogate rights to quantities of water which have been established by any State. Federal agencies shall co-operate with State and local agencies to develop comprehensive solutions to prevent, reduce and eliminate pollution in concert with programs for managing water resources.

The USEPA retains the right to regulate water quality standards and requires each State to meet the water quality critera through development of their own enforcement program. If the State does not meet the goals of the EPA, there is no delegation authority, and the State cannot issue NPDES Permits. NPDES is an acronym for National Pollution Discharge Elimination System – the program which sets up the limits for an entity's[ii] discharge into interstate waters[iii].

The States must develop their own water quality standards and enforce them. The State standards and goals must be at least as stringent as those of the Federal Government. The following requirements are set out for State Water Quality goals under Chapter 40 of the Code of Federal Regulations, Part 131.6 (references within the Code refer to either the Clean Water Act or other sections of the Code itself).[iv]

The following elements **must** be included in each State's water quality standards submitted to EPA for review:

(a) Use designations consistent with the provisions of sections 101(a)(2) and 303(c)(2) of the Act.

(b) Methods used and analyses conducted to support water quality standards revisions.

(c) Water quality criteria sufficient to protect the designated uses.

(d) An antidegradation policy consistent with §131.12.

(e) Certification by the State Attorney General or other appropriate legal authority within the State that the water quality standards were duly adopted pursuant to State law.

(f) General information which will aid the Agency in determining the adequacy of the scientific basis of the standards which do not include the uses specified in section 101(a)(2) of the Act as well as information on general policies applicable to State standards which may affect their application and implementation.

In general, the States must consider the following in setting Water Quality Standards[v]:

(a) Each State **must specify appropriate water uses** to be achieved and protected. The classification of the waters of the **State must take into consideration the use and value of water for public water supplies, protection and propagation of fish, shellfish and wildlife, recreation in and on the water, agricultural, industrial, and other purposes including navigation…**

(b) In designating uses of a water body and the appropriate criteria for those uses, the State **shall take into consideration the water quality standards of downstream waters and shall ensure that its water quality standards provide for the attainment and maintenance of the water quality standards of downstream waters. …**

(f) States may adopt seasonal uses as an alternative to reclassifying a water body or segment thereof to uses requiring less stringent water quality criteria. If seasonal uses are adopted, water quality criteria should be adjusted to reflect the seasonal uses, however, such criteria shall not preclude the attainment and maintenance of a more protective use in another season.

(g) States may designate a use, or remove a use that is "*not*" an existing use, if the State conducts a use attainability analysis … that demonstrates attaining the use is not feasible because of one of the six factors (listed below)in this paragraph.

(1) Naturally occurring pollutant concentrations prevent the attainment of the use; or

(2) Natural, ephemeral, intermittent or low flow conditions or water levels prevent the attainment of the use, unless these conditions may be compensated for by the discharge of sufficient volume of effluent discharges without violating State water conservation requirements to enable uses to be met; or

(3) Human caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place; or

(4) Dams, diversions or other types of hydrologic modifications preclude the attainment of the use, and it is not feasible to restore the water body to its original condition or to operate such modification in a way that would result in the attainment of the use; or

(5) Physical conditions related to the natural features of the water body, such as the lack of a proper substrate, cover, flow, depth, pools, riffles, and the like, unrelated to water quality, preclude attainment of aquatic life protection uses; or

(6) Controls more stringent than those required by sections 301(b) and 306 of the Act would result in substantial and widespread economic and social impact.[vi]

Some of the factors which the EPA and States may regulate include: Temperature/Temperature Increase due to thermal discharges; pH; recreational uses; water supply for human and animal uses; radioactive water quality; commerce and navigation; religious and ceremonial uses; fishing uses, habitat uses for aquatic life; industrial uses, settleable solids, the presence of toxic compounds, turbidity[vii], dissolved metals, dissolved gases, and other miscellaneous uses, including specific water quality concentrations. (This list is not comprehensive, and the reader is referred to the regulations for more detail.)

The EPA also requires that the water quality standards be protective of downstream uses and have a provision for future uses. There is only one place where water quality standards do not apply, and that is immediately downstream of a discharge point in an area defined as a "mixing zone". The mixing zone is an area where the discharge into the stream or river mixes with the upstream water. Beyond the mixing zone, water quality standards apply[viii].

The following figure is taken from 40 CFR 133.8 illustrates the type and kind of numerical water quality limits. The table shows the first 25 of 125 numerical standards for the State of California.

Figure 1. Typical numerical Water Quality Limits (part of longer table)

Note that the standards are both for fresh and salt water and for consumption of water and organisms, and for the consumption of organisms only (fish). The standards contain both maximum concentrations and continuous concentrations for the various pollutants. These will be reflected in any application for a permit to discharge to the waters of the US.

There is also a TMDL, or Total Maximum Daily Load limit for all waters. The TMDL reflects the EPA's or State's judgment about the total maximum quantity of a pollutant which the water body or stream should receive without violating the water quality limits on that particular body. In some instances, the TMDL is an override over discharge limits and appropriately water quality standards, and those standards and all permits for discharge to that waterbody may be revised downward if the TMDL is re-evaluated downward.

3. AQUATIC TOXICITY:

The EPA/State has the right to ask for tests for aquatic toxicity. These tests are run on serial dilutions of the proposed or actual effluent wastewater at varying strengths, generally from 10% to 100% of the concentration. Common standard test species are the fathead minnow (Pimephales promelas), daphnids (Daphnia magna, D. pulex, D. pulicaria, Ceriodaphnia dubia), midge (Chironomus tentans, C. ruparius), rainbow trout (Oncorhynchus mykiss), sheepshead minnow (Cyprinodon variegatu), mysids (Mysidopsis), oyster (Crassotreas), scud (Hyalalla Azteca), grass shrimp (Palaemonetes pugio), mussels (Mytilus).

The most common test organisms are a specific type of water fleas and fathead minnows. The tests are run for 48 hours and 96 hours and compared to a control group. The testing procedure counts the number of surviving organisms and bases the permit limits for water quality upon the toxicity. If the toxicity is greater than 20% of the discharge concentration, the tests must be re-run, and it is quite likely that the aquatic testing procedure will appear in the final permit.

4. PERMIT LIMITS

The permittee should be cautious about the manner in which the local environmental agency sets the limits on the permit. Normally, there are two limits specified, a Daily Maximum and a Monthly Average. The minimum sampling frequency for reporting purposes is also specified in the permit. All analyses must be reported on the permit. The penalty for non-reporting and falsifying data are enormous and personal and

can and have resulted in jail time for those caught falsifying data. Plus, the expense of defending oneself against a potential criminal proceeding can be highly disruptive to personal finances, and most companies and governmental entities will not provide compensation or legal defense.

Table 1 Typical numerical water quality limits (part of a longer table—abridged)

A		B Freshwater		C Saltwater		D Human Health (10^{-6} risk for carcinogens) For consumption of:	
# Compound	CAS Number	Criterion Maximum Conc. [d] B1	Criterion Continuous Conc. [d] B2	Criterion Maximum Conc. [d] C1	Criterion Continuous Conc. [d] C2	Water & Organisms (µg/L) D1	Organisms Only (µg/L) D2
1. Antimony	7440360					14 a,s	4300 a,t
2. Arsenic [b]	7440382	340 i,m,w	150 i,m,w	69 i,m	36 i,m		
3. Beryllium	7440417					n	n
4. Cadmium [b]	7440439	4.3 e,i,m,w,x	2.2 e,i,m,w	42 i,m	9.3 i,m	n	n
5a. Chromium (III)	16065831	550 e,i,m,o	180 e,i,m,o			n	n
5b. Chromium (VI) [b]	18540299	16 i,m,w	11 i,m,w	1100 i,m	50 i,m	n	n
6. Copper [b]	7440508	13 e,i,m,w,x	9.0 e,i,m,w	4.8 i,m	3.1 i,m	1300	
7. Lead [b]	7439921	65 e,i,m	2.5 e,i,m	210 i,m	8.1 i,m	n	n
8. Mercury [b]	7439976	[Reserved]	[Reserved]	[Reserved]	[Reserved]	0.050 a	0.051 a
9. Nickel [b]	7440020	470 e,i,m,w	52 e,i,m,w	74 i,m	8.2 i,m	610 a	4600 a
10. Selenium [b]	7782492	[Reserved] p	5.0 q	290 i,m	71 i,m	n	n
11. Silver [b]	7440224	3.4 e,i,m		1.9 i,m			
12. Thallium	7440280					1.7 a,s	6.3 a,t
13. Zinc [b]	7440666	120 e,i,m,w,x	120 e,i,m,w	90 i,m	81 i,m		
14. Cyanide [b]	57125	22 o	5.2 o	1 r	1 r	700 a	220,000 a,j
15. Asbestos	1332214					7,000,000 fibers/L k,s	
16. 2,3,7,8-TCDD (Dioxin)	1746016					0.000000013 c	0.000000014 c
17. Acrolein	107028					320 s	780 t
18. Acrylonitrile	107131					0.059 a,c,s	0.66 a,c,t
19. Benzene	71432					1.2 a,c	71 a,c
20. Bromoform	75252					4.3 a,c	360 a,c
21. Carbon Tetrachloride	56235					0.25 a,c,s	4.4 a,c,t
22. Chlorobenzene	108907					680 a,s	21,000 a,j,t
23. Chlorodibromomethane	124481					0.401 a,c	34 a,c
24. Chloroethane	75003						
25. 2-Chloroethylvinyl Ether	110758						

The letters following the numerical standards denote special conditions or modifiers. For an explanation see the referenced standard.

The limits on the permit are frequently developed using a Student's T distribution, where the Daily Maximum is specified at two times the Monthly Average figure. Experience has shown that most environmental and discharge data are non-normally distributed, but can often be correlated through use of log-normal or Weibull statistics. The reason for this is that the statistics make physical sense and have a fat statistical tail[ix]. There are no negative numbers in a discharge permit, and the possibility of inadvertent permit exceedences at more than twice the Monthly Average should be accommodated. In recent years, the EPA has instituted provisions in their permit negotiation strategies to accommodate this data. The permittee is advised to search the www.epa.gov website for the NPDES Permit Writer's Manual, download and read it carefully to understand the philosophy behind the permit and the limitations imposed upon the Permit writer.

5, PENALTIES

The USEPA is examines the monthly Discharge Monitoring Reports carefully because they are the basis for imposition of fines and penalties. The data submitted must be representative of the actual discharge, and any data or analyses collected which are related to the analyses required by the Permit, or related data which can be correlated to actual discharge measurements and quantities must be reported. It is possible to develop "unofficial methods" for discharge monitoring which are indicative but not conclusive of the actual discharge measurements.

The samplers and flowmeters must be reporting with reasonable accuracy[x]. Penalties for non-compliance with the terms and conditions of the NPDES permit may subject the user to both civil and criminal penalties. Currently, the maximum civil penalty which can be imposed is $25,000 for each day of permit violation, and a permit exceedance is considered as a day of violation. Additional penalties can be imposed for violation of monthly average values in the permit of $25,000 per day times the number of days in the month[xi]. Lesser penalties can also be imposed. If the non-compliance is deliberate, or involving falsification of data, criminal penalties can be imposed of up to 3 years in jail for knowing violations and 1 year in jail for negligent violations of data reporting under the Clean Water Act[xii]. The penalties can apply to operators, and corporate officers. The penalties for deliberate falsification of data, deliberate pollution, or deliberate bypassing of treatment facilities are often charged against a person, and/or a high ranking corporate officer[xiii]. Many corporations will not pay for legal defenses nor fines associated with deliberate criminal acts.

In the event of new construction, even during the test and shakeout period within the facility, the permit limits are in force from the first day the facility is in operation or from the first day that the wastewater treatment plant is ready to discharge. This needs to be factored into the planning for facility operation.

6. MUNICIPAL ENFORCEMENT

The USEPA enforces municipal discharges through use of sewer discharge standards. These standards regulate which substances and quantities can be discharged to a municipal sewer system. The regulations are inclusive of toxic materials and strong biological (oxygen consuming) substances, metals, pesticides, and other "noxious substances" including oils and detergents[xiv].

Municipal wastewater treatment plants often have a limit on the discharge from their plants. It is not uncommon for municipal effluent limits to have a BOD_5 of under 15 mg/l, and quite often under 10 mg/l. In cases, where water is being recycled, some environmental discharge permits have discharge limitations in single digits, sometimes under 5 mg/l.[xv]

7. OTHER ACTIONS

The USEPA has the authority to totally ban the discharge from any site. For example, the application of Best Available Technology for Concentrated Animal Feedlot Operations requires (CAFOs) have no discharge to any navigable waterway of the US[xvi]. The provisions for discharge are contained within the Effluent Guidelines in the Clean Water Act[xvii].

The EPA also regulates stormwater discharges. Stormwater discharges often from municipalities, can contain large quantities of pollutants in the "first flush" – the period when the rainfall just starts and before it reaches equilibrium to wash contaminants from the streets and sidewalks of cities. One of the specific problems with stormwater discharges is the extremely large quantities of flow. One rainstorm can increase the flow in combined (storm and sanitary) sewers by a factor of 10X or more, depending upon the size and drainage basin of the sewer system and the design of the street catchments, and other factors. EPA also regulates stormwater discharges from industries, and requires monitoring of discharge locations.

The States and the EPA also have the authority to regulate discharged water quality from land-disturbing and construction sites. Construction sites must have silt fences and sediment control ponds. The limitation on discharge water quality is based upon the differences between upstream and downstream turbidity[xviii] in the waterbody (stream) into which the site drains.

The Army Corps of Engineers is primarily responsible for activities involving dredging and filling of navigable waterways, but the EPA can also exercise influence in that area.

Any facility storing more than 660 US gallons of oil, must have a Spill Prevention Control and Countermeasure Plan (SPCC Plan), certified by a professional engineer, which will prevent the

discharge of oils to the surface waters of the US. Larger facilities with oil storage equal to or in excess of 42,000 US gallons must have a Facility Response Plan—a plan which lists the actions and equipment and response times available for prevention of substantial harm to US waters in the event of a spill. The FR Plans must be available to the Regional Administrator of the USEPA and these plans require information about:

" the age of tanks;
type of transfer operations;
oil storage capacity;
lack of secondary containment;
proximity to fish, wildlife, and sensitive environments or drinking-water intakes;
spill history and frequency of past discharges; or
other information, including local impacts on public health."

The qualifying oil storage facilities must also have contractual obligations for response to spills, which does include oil spill control booming and cleanup, shoreline cleanup from oil spills, and bird and animal rescue and cleanup, and where required wetland cleanup and restoration.

If a facility requires either dredging of a waterway (for the passage of shipping, such as in Savannah, Georgia), the EPA works in concert with the US Army Corps of Engineers in the issuance and monitoring of wetlands, their identification, alteration, and all activities which involve modification of the wetland. A wetland is defined by the soil matrix and the fact that it is submerged or partially submerged for a portion of a calendar year[xix]. The COE is the enforcer and controls permit issuance. The EPA monitors the performance and chemical quality of the waters during and after the dredging operations.

The EPA also regulates the discharge of Hazardous Waste and Hazardous Materials from storage areas. In order to prevent spills from sites containing Hazardous Wastes, a very strict set of Engineering controls and diking are required[xx], along with documented spill control and inspection procedures.

8 EU PERMITTING

There are a number similarities between the US and the EU when it comes to the initial application for a water discharge permit. First, however, is the requirement to satisfy the country specific laws which may be different from the EU laws for siting of the facility[xxi].

The EU Water Directive of 23 October 2000,[xxii]. is both broader and more protective than the Clean Water Act in that it addresses groundwater protection, wetlands protection and conversation, freshwater and near-shore ocean waters, and stormwater runoff control and prevention of damage from storm water, in a comprehensive framework for EU member states.

As a start, the EU Water Directive (Directive) requires member states to register areas to be protected such as those which currently or are intended for human water consumption (any body of water serving more than 50 persons[xxiii]) or consumption of more than 10 M^3/day, and establishes monitoring requirements for waterbodies which provide more than 100 M^3/day for drinking water. This provision must be incorporated into the mandated Member State's River Basin Management Plans.

The EU Directive also establishes the principle that, "the polluter pays". This means that the cost for monitoring, control, and regulation is paid by the polluter. In addition, the Commission is required to set forth a list of priority pollutants which pose significant risk to the aquatic environment, either by development of a risk assessment for the pollutants, or by targeted risk-based assessment, or when necessary, perform a simplified risk assessment for pollutant evaluation[xxiv].

In Section 1.2, of the EU Directive ecoregions and surface water body types in to A and B classifications are established, along with a classification system for Rivers, Lakes, Transitional Waters, and Costal Waters.

> *"Transitional waters are bodies of surface water in the vicinity of river mouths which are partly saline in character as a result of their proximity to coastal waters but which are substantially influenced by freshwater flows"*

Annex XI of the Directive contains two maps which define the ecoregions for rivers and lakes, and a map of ecoregions for transitional and costal waters. The ecoregions stretch from the Mediterranean and Black Sea to the mid-Atlantic in a Meridian line South of Greenland, and includes Guadeloupe/Martinique, Guyana, and Reunion[xxv], as shown below. The boundaries between fresh and coastal waters must be ecologically relevant

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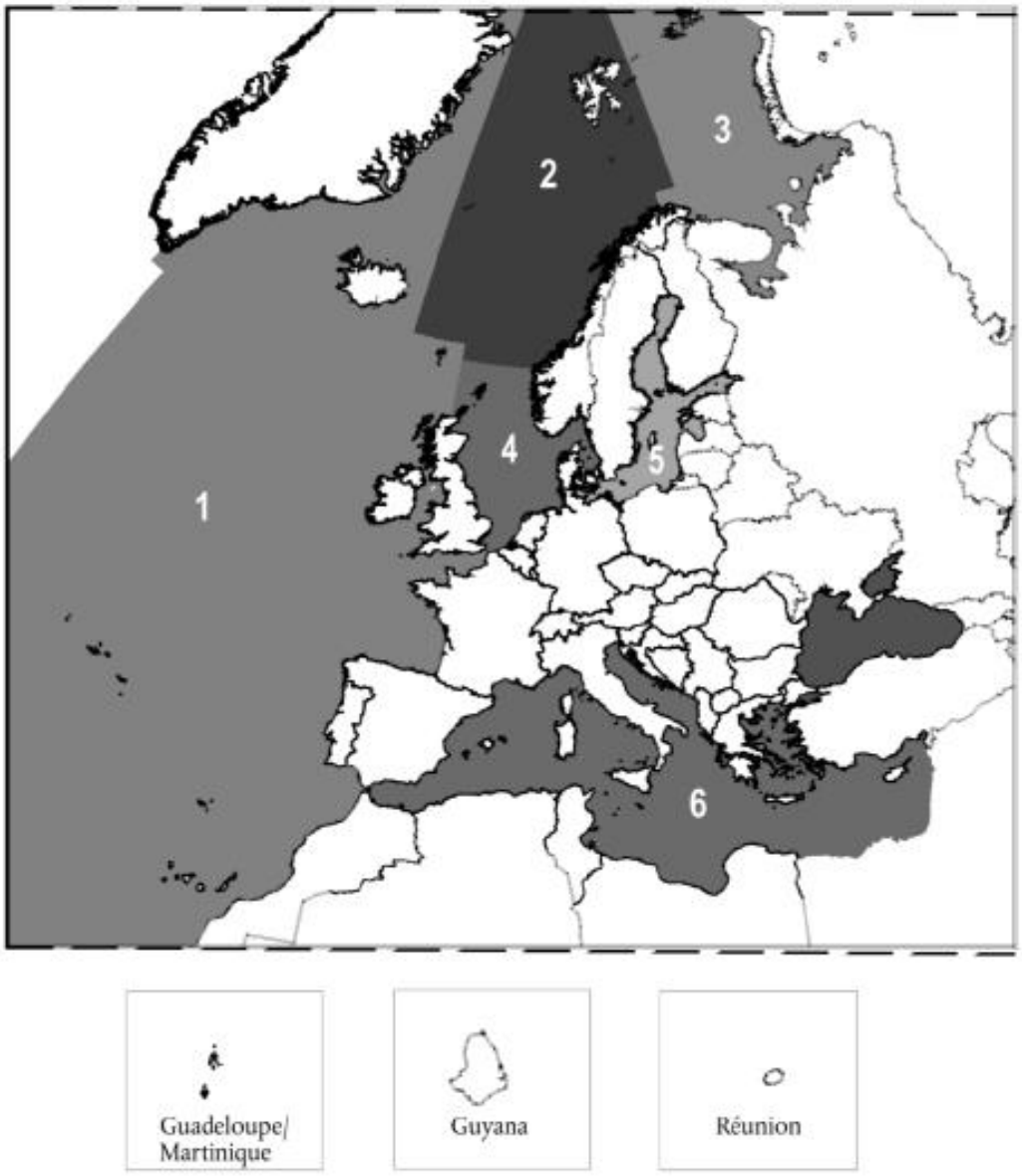

***Figure 1**. EU Ecoregions for transitional And Coastal Waters. Source Water Framework Directive: 200/60/EC*

MAP A

System A: Ecoregions for rivers and lakes

1. Iberic-Macaronesian region
2. Pyrenees
3. Italy, Corsica and Malta
4. Alps
5. Dinaric western Balkan
6. Hellenic western Balkan
7. Eastern Balkan
8. Western highlands
9. Central highlands
10. The Carpathians
11. Hungarian lowlands
12. Pontic province
13. Western plains
14. Central plains
15. Baltic province
16. Eastern plains
17. Ireland and Northern Ireland
18. Great Britain
19. Iceland
20. Borealic uplands
21. Tundra
22. Fenno-Scandian shield
23. Taiga
24. The Caucasus
25. Caspic depression

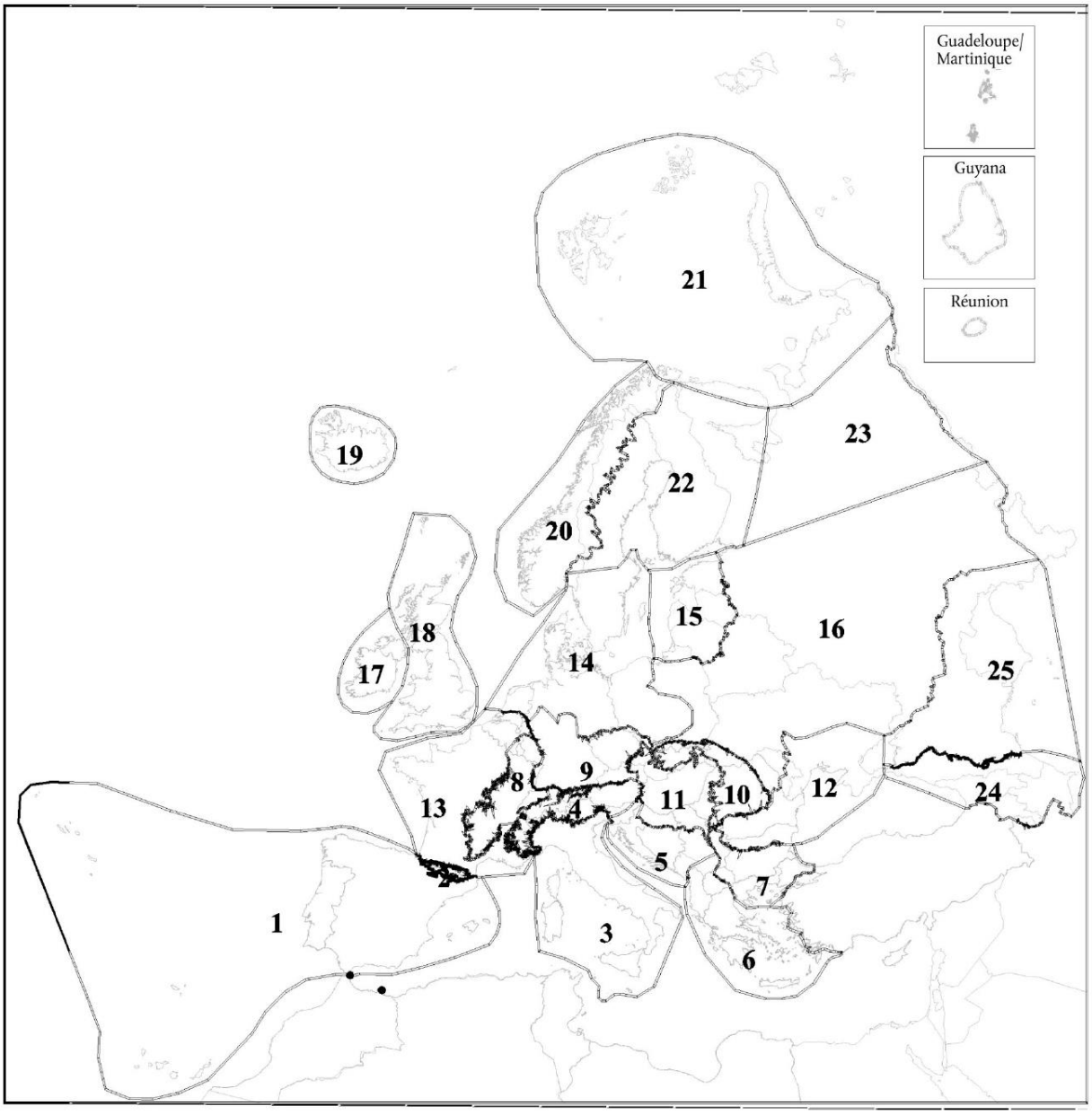

Figure 2 Ecoregions for rivers and lakes. Source: Water Framework directive 200/60/EC

Annex VIII of the EC Directive lists the main pollutants of concern:

Organohalogen compounds and substances which my form such compounds in the environment
Organophosphorous Compounds
Organotin Compounds
Persistent hydrocarbons and bioaccumulative organic toxic substances
Cyanides
Metals and their compounds
Arsenic and compounds
Biocides and plant protecton producs
Materials in suspension (Suspended Solids)
Eutrophic substances, nitrates and phosphates
Substances such as BOD, COD, and others which can unfavorably influence the oxygen balance
Substances, preparations, or degradation products which may have carcinogenic, mutagenic, or which may influence steoidogenic, thyroid, reproduction, endocrine related functions or other similar compounds in the aquatic environment
Mercury
Cadmium
Hexachlorohexane
And
Dangerous Substances (86/280/EEC --OJ L 181, 4.7.1986, p. 16*)*

The effluent from a municipal treatment plant in the EU (Ireland) should be a maximum of 25 mg/l BOD_5, with a COD of 125 mg/l or less[xxvi]. The comparable values in the UK (pre-separation from the EU) may be in the single digits if it is necessary to achieve water quality standards. The setting of UK (N. Ireland) water quality standards depends upon the location of the waterbody, and a number of physical and environmental factors[xxvii].

9. GROUNDWATERS

Section 2 of the directive addresses the factors to be identified and characterized for Groundwater, including locations, boundaries, potential sources of pollutions, recharge, and those areas where surface water ecosystems are dependent upon groundwater conditions and discharges.

10 ADDITIONAL MEASURES

As a part of the Directive, there is a list of additional mandatory and optional directives which anyone applying for a permit should investigate. That list is shown below:

LISTS OF MEASURES TO BE INCLUDED WITHIN THE PROGRAMMES OF MEASURES

PART A

Measures required under the following Directives:

(i) The Bathing Water Directive (76/160/EEC);
(ii) The Birds Directive (79/409/EEC) ([1]);
(iii) The Drinking Water Directive (80/778/EEC) as amended by Directive (98/83/EC);
(iv) The Major Accidents (Seveso) Directive (96/82/EC) ([2]);
(v) The Environmental Impact Assessment Directive (85/337/EEC) ([3]);
(vi) The Sewage Sludge Directive (86/278/EEC) ([4]);
(vii) The Urban Waste-water Treatment Directive (91/271/EEC);
(viii) The Plant Protection Products Directive (91/414/EEC);
(ix) The Nitrates Directive (91/676/EEC);
(x) The Habitats Directive (92/43/EEC)[5]);
(xi) The Integrated Pollution Prevention Control Directive (96/61/EC).

PART B

The following is a non-exclusive list of supplementary measures which Member States within each river basin district may choose to adopt as part of the programme of measures required under Article 11(4):

(i) legislative instruments
(ii) administrative instruments
(iii) economic or fiscal instruments
(iv) negotiated environmental agreements
(v) emission controls
(vi) codes of good practice
(vii) recreation and restoration of wetlands areas
(viii) abstraction controls
(ix) demand management measures, *inter alia*, promotion of adapted agricultural production such as low water requiring crops in areas affected by drought
(x) efficiency and reuse measures, *inter alia*, promotion of water-efficient technologies in industry and water-saving irrigation techniques

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([1]) OJ L 103, 25.4.1979, p. 1.

([2]) OJ L 10, 14.1.1997, p. 13.

([3]) OJ L 175, 5.7.1985, p. 40. Directive as amended by Directive 97/11/EC (OJ L 73, 14.3.1997, p. 5).

([4]) OJ L 181, 8.7.1986, p. 6.

([5]) OJ L 206, 22.7.1992, p. 7.

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11. BOTTOM LINE CONSIDERATIONS AND COMPARISONS:

Both the US and the EU water environments are highly regulated. In the EU the enforcement is principally left up to the individual member states to follow the Directives. In the US, enforcement authority is retained by the USEPA but can be delegated to states which are as restrictive or more restrictive than Federally mandated requirements for enforcement of water quality issues and programs.

One of the largest differences between the EU and the US resides in the area of enforcement penalties for non-compliance with permits and directives. Because the EU has the “polluter pays” policy, they in effect have a meter on the effluent for parameters of interest. Permit exceedances in the EU are treated as extensions of the permit — if the rate for discharge of pollutant X is 5 Euros per KG, and the permittee discharges twice that amount, the permittee will pay for the new discharge at the same rate. It is analogous to the use for certain utilities, principally electricity and gas, where the more one uses, the more one pays.

In the US, the EPA has a very large enforcement tool (hammer), and when a polluter violates their permit terms and conditions, the EPA or the State may choose to strike them with that hammer in the form of fines and penalties, including, where appropriate, criminal penalties. The enforcement by the USEPA is often uneven and is seldom used against municipal and governmental facilities but tends to be rigorously enforced against industrial and privately owned facilities. As previously mentioned, the enforcement for civil violations of the permit terms and conditions can be $25,000 dollars per day, with each day of non-compliance being a separate incident which could accumulate fines for non-compliance. Also, the permit terms and conditions in the US system does not allow for non-compliance during startup of a process; when starting up a new facility. The Permit terms and conditions be followed, regardless of what may be happening within the plant or business.

It should also be noted that the USEPA has an Enforcement Compliance Strike Team for use against the worst polluters. This team is comprised of deputized Federal Marshalls, scientists authorized to carry weapons for enforcement purposes, and collect data for the purposes of prosecution of violators, and where necessary, to make arrests. The team function is both scientific and enforcement.

LIST OF TERMS

Term or Acronym	Reference
EPA, USEPA	United States Environmental Protection Agency or individual State's Environmental Enforcement Program, often referred to as **EPD**: Environmental Protection Division **DNR**: State office of EPA **DEQ**: Department of Environmental Quality **DEP**: Department of Environmental Protection
NPDES	**USEPA's National Pollution Discharge Elimination System**
DMR	**USEPA's Discharge Monitoring Reports (to be filed on a monthly basis)1**
CWA	**Clean Water Act (US)**
Code	**US Code of Federal Regulations** which is the manner in which the legislation is implemented.
XX CFR Part YY	Refers to specific sections and chapters of the **US Code of Regulations**. Most environmental regulations are in Chapter 40 of the CFR
Monthly Average, Daily Maximum	Values obtained by measuring the discharge flow and mulitplying it by the concentration. Monthly Average is the average of several samples taken at a frequency prescribed by the Permit, averaged over the month. Daily Maximum is the maximum permissible discharge calculated on a daily basis.
CAFO	**Concentrated Animal Feeding Operation**
First Flush	When a storm event occurs the "**first flush**" is the higher concentration of contaminants in the stormwater derived from the washing of the streets, sidewalks, rooftops, etc. The first flush usually stops when the accumulated dirt, solids, etc. have been washed into the sewers.
SPCC	**Spill Prevention Control and Countermeasure Plan:** A plan required by the USEPA for any facilities which store oil more than 660 gallons in aboveground tanks. Facilities with storage in excess of 42,000 gallons must also have a **Facility Response Plan**
COE	**US Army Corps of Engineers** – the agency usually charged with the enforcement of maintenance and permitting for wetlands in the US.
EU	**European Union**
XX/YY/EEC (numbers)	Citation for specific chapters of the various EU directives
KG, mg, mg/l	Kilograms, milligrams, milligrams per liter
Effluent Guidelines	USEPA series of technical publications which form the technical basis categorical pretreatment and treatment standards by USEPA water discharges.
TMDL	**Total Daily Maximum Load**- the maximum daily quantity of a particular pollutant which a body of water can sustain without degredation.
BOD_5	**Five Day Biochemical Oxygen Demand** – the measure of the quantity of dissolved oxygen consumed in terms of milligrams/liter by an acclimitzed bacterial population when using a specific waste material as a substrate

End Notes

[iii]i (June 30, 1948, ch. 758, title I, § 101, as added Pub. L. 92–500, § 2, Oct. 18, 1972, 86 Stat. 816; amended Pub. L. 95–217, §§ 5(a), 26(b), Dec. 27, 1977, 91 Stat. 1567, 1575; Pub. L. 100–4, title III, § 316(b), Feb. 4, 1987, 101 Stat. 60.)

[ii] In this case, entity means individual, corporation, governmental body (both State and Federal), and utilities

[iii] In most instances the law applies to streams and rivers. There is an additional caveat which indicates that Interstate Commerce must be associated with the waterbody. One of the few known exceptions for this requirement is in Florida where an industrial discharger discharges its effluent directly to a sinkhole, and neither the State nor the Federal Government has been able to trace the flow from the sinkhole to the waters of the State.

[iv] There are separate provisions for Native American Tribes to set and conduct their own water quality policies.

[v] 40 CFR Section 131.10

[vi] 48 FR 51405, Nov. 8, 1983, as amended at 80 FR 51047, Aug. 21, 2015

[vii] Turbidity is a curious pollutant because it is a measure of transmittance/reflectivity of light, and it is dependent upon the shape and reflectivity of suspended solids in the water

but does not correlate well with the concentration of the solid particles in the water.

[viii] At one time, the mixing zone could be up to 1/3 of the volume of the stream for an arbitrarily defined distance downstream. Water quality standards did not apply within the mixing zone. There is a guidance document for mixing zones, Compilation of EPA Mixing Zone Documents The document is available from National Service Center for Environmental Publications (NSCEP). There are also Mixing Zone Guidance for Chronic Toxicity and Zones of Initial Dilution, and Dilution Models for Effluent Discharges (Third Edition -1994) and Mixing Zones Water Quality Standards Criteria Summaries Compilation of State/Federal Criteria EPA 440/5-88/015 (September 1988). There is also an expert guidance hydrodynamic model for mixing zone analysis called CORMIX2, but it is believed to have limited application unless a discharger is using a diffuser. The program is commercially available but are relatively expensive costing a minimum of $1500 for an academic user license for one year.

[ix] A "fat statistical tail" means that the discharges for Daily Maximum in the NPDES permit are often greater than two times the Monthly Average Discharge limitation. This condition is often due to unplanned releases of inventoried materials or materials in process from spills, leaks, tank ruptures, equipment malfunctions etc. which are a part of everyday plant life. These releases may not be thoroughly caught and treated by even the best treatment plant, and may escape into the effluent stream causing permit exceedences. This is particularly true of the measurement of pH in waters where there is low alkalinity.

[x] See the article: "Monitoring and Sampling Liquid Effluents," by David L Russell, PE, in Chemical Engineering Magazine, October 20, 1980, also available from the downloads section of Globalenvironmental.biz in the downloads section.

[xi] See the USEPA's INTERIM CLEAN WATER ACT SETTLEMENT PENALTY POLICY March 1, 1995 for specific guidance on the calculation of penalties.

xii Jail time has been assessed as a penalty For example: In United States v. Weitzenhoff,3 the court affirmed the felony convictions of Weitzenhoff and Mariani for violations of the Clean Water Act ("CWA"), which provides that anyone who "knowingly violates" certain sections of the CWA "or any permit condition or limitation implementing any such sections" is guilty of a felony., Weitzenhoff was sentenced to twenty-one months and Mariani to thirty-three months imprisonment. Weitzenhoff was the manager and Mariani was the assistant manager of the East Honolulu Community Services Sewage Treatment Plant on the Hawaiian island of Oahu. The plant operates under a National Pollution Discharge Elimination System ("NPDES") permit which establishes limitations for effluent discharges in the ocean. During fourteen months in 1988 and 1989, the plant exceeded its NPDES permit effluent limitations by six percent.' Weitzenhoff and Mariani defended their failure to maintain levels within permit limitations by asserting that, according to their interpretation of the NPDES permit, the discharges were permissible." The district court, however, made their assertion irrelevant by refusing to provide the jury with the mens rea instruction sought by the defendants. Instead, the district court construed "knowingly" in § 1319(c)(2)(A) of the CWA as merely requiring that Weitzenhoff and Mariani knew they were discharging pollutants into the ocean and not that they knew the discharges violated the NPDES permit. Accordingly, the court refused to instruct the jury on the defendants' proposed affirmative defense that they did not know their actions violated the NPDES permit.

[xiii] In a former life, when the author was working for a one of several chemical companies, the standing joke was that the Corporate Vice President of Environmental Affairs was the designated "Vice President in charge of going to jail."

[xiv] The regulations are found in 40 CFR Part 403. The regulations contain numerical limits for discharge of wastewater into municipal sewer systems.

[xv] Gwinnett County, Georgia, advanced wastewater treatment plant discharges into Lake Lanier which is the source of Atlanta's drinking water. The discharge BOD_5 limit is 3 mg/l which is better than the natural BOD_5 of the lake water.

xvi The definition of a navigable waterway is undergoing a legal challenge with regard to its application to very small waterways and farm-ponds. A navigable waterway under the old definition was generally considered "anything you can float a log in". Under Section 502 of the CWA, the language specifies "navigable waterways including the territorial seas" of the United States. The 1977 "Civilitti Memo" to the US Army Corps of Engineers essentially defined a navigable waterway is anything the EPA administrator says it is.

[xvii] The Effluent Guidelines are found in 40 CFR Part 400-466 for specific industries. There exist over 40 categories of industries for which there are Effluent Guidelines. The Guidelines themselves are often less than helpful as they do not address specific technologies. Many of the Guidelines were developed in the 1970's and the Guideline Development Documents address specific technologies, and provide clarification for the basis of the development of the industry specific guideline.

[xviii] Turbidity is a laboratory measurement which is un-related to suspended solids because it is based upon reflectivity of light through a calibrated cell. The particle shape and reflectance is not related to the suspended solids concentration in the water.

[xix] In one instance, a developer in a trailer park treated domestic wastewaters in an aerated pond on his private property. Later, when regional sewerage service was available, the pond was cleaned out and abandoned in place, and existed as a small lake. Some 30 years later, an employee filled in a portion of the pond, an action which invoked ire of the EPA and Corps of Engineers for partially destroying a wetland (the banks of the former sewage pond). Civil settlement of the EPA and COE complaint led the developer to provide a dedicated nature park wetland area in the floodplain of a local stream. The park was

dedicated in perpetuity with land covenants to prevent future development. The park is over 5 acres: the original pond area filled in was less than ½ acre.

[xx] The requirements for Hazardous Waste Treatment, Storage Disposal Facilities can be found in 40 CFR Parts 264 and 265.

[xxi] An excellent reference on relevant procedures and applicable laws is found on the Internet at the following address: www.enviroCentre.ie "How to obtain an effluent discharge license" 12 page PDF (2015)

[xxii] DIRECTIVE 2000/60/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 October 2000 establishing a framework for Community action in the field of water policy

[xxiii] Note that the 50 person requirement is in many ways similar to the US Safe Drinking Water Act definition of a public water supply as one serving 25 persons, at least 50 days per year.

[xxiv] The risk assessments are to be based upon the recommendations form the EU Scientific Committee on Toxicity, Ecotoxicity and the Environment

[xxv] In 2009, the River Basin Management Plans were produced and included final classification of the ecological status of water bodies. In 2010 the Water Pricing Policies were set.

[xxvi] Council Directive 2000/60/EC of 23 October 2000 establishing a framework for Community action in the field of water policy

[xxvii] Water Framework Directive (Priority Substances and Classification) Regulations (Northern Ireland) 2011 The factors include alkalinity, ammonia, phosphorous, and other parameters and dissolved metals, including arsenic and chromium. The BOD standard for rivers is 3-4 mg/l for good quality rivers, and greater than 9 mg/l for poor quality rivers (Table 3).