美国水环境生物监测体系及对我国生物监测的建议(续)

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摘　要:综合分析了美国水环境生物监测体系的框架,对相关法律法规、生物监测技术体系的构成,包括生物种群/群落调查、毒性试验、微生物测试、鱼组织污染物分析的主要内容与开展意义进行了较为系统的描述。对我国深入开展水环境生物监测提供了一些参考借鉴,建议完善法律法规;更新方法体系,完善质量标准;逐步拓展生物监测能力。

关键词:生物监测体系;水环境;美国;中国
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American Water Environment Bio-monitoring System and Its Suggestion for Bio-monitoring in China(Continue)

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Abstract: The bio-monitoring system framework of U. S. water environment was comprehensively analyzed. The main contents and significance of the relevant laws and regulations,the composition of bio-monitoring technology system were systematically described including the investigation of biological populations and communities,toxicity test,microbiological test,fish tissue contaminant analysis. The analytical results provided some reference to the in-depth development of China bio-monitoring of water environment.

Key words: Bio-monitoring system; Water environment; The United States; China

3.2　对我国开展生物监测的建议

生物监测因灵敏度高、综合性强的特点引起了环境管理和技术部门的高度重视,纵观国外生物监测技术体系的构成与发展趋势,对我国如何发展生物监测技术提出以下建议:

(1)完善法律法规。法律法规注重生物生态完整性,从政策和法规层面提出生物监测及生物生态保护的要求。目前,我国的环保政策以"污染防治"为重点,尚未达到以"生态健康"为重点。从为环境管理服务的角度,一方面各级政府主管部门没有在地方立法和政策上对生物监测提出明确、系统的要求,使得生物监测不能有效地发挥为政策服务的潜力;另一方面,由于技术水平的限制,使得生物监测的服务功能不强,缺少立法和政策的要求造成生物监测"无的放矢"。在"十二五"新阶段,生态保护和生物监测的重要性凸显,今后我国环境监测领域进入快速质变性发展新阶段的一个关键转变,是将生物监测纳入法规要求,将生物指标作为环境质量评价的重要指标参数。

(2)更新方法体系,完善质量标准。建立生物监测方法体系,同时在环境质量标准中设置配套的生物监测指标。标准分析方法的建立可优先考虑国外标准方法和国内成熟方法的借鉴与转化应用,加快方法标准化的研究进程,弥补标准分析方法缺失和更新慢等问题。发展生物监测技术方法体系的同时,应当鼓励制定地方环境生物质量标准,以保证监测活动能有的放矢,监测数据能有效利用。亟需改变当前环境质量标准中生物学目标普遍缺

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失、法律地位不明的尴尬局面。一方面,可参考和借鉴国外生物监测体系,如美国各州质量报告书中生物监测体系的内容,特别是生物评价体系的构成和生物数据在环境质量评价中的应用,分析、筛选适合构建我国生物监测评价体系的信息;另一方面,考虑到在全国层面不适合用严格统一划线的方式制定指标和评价标准,应指导各地选择适合本地域、流域生物生态特点的指标及发展方向。通过基于法律法规到监测技术体系的完善过程,生物监测的目的将由污染程度评价拓展到生态健康评价,生物监测数据将在环境管理方面体现直接有效的支持作用和服务优势。

(3)逐步拓展监测能力。目前,我国监测系统普遍具备水体微生物的常规监测能力,缺乏对生态系统生物质量的监测能力,因而很难根据生物健康的因素反映水环境生态质量的健康状况。建议一方面在现有基础上拓宽生物质量监测范围,增加浮游植物、浮游动物、着生生物、底栖、鱼类等生物种群的常规监测能力,方法可参照已有的生物监测技术手册,还可以通过实际监测工作对现有方法调整优化,完善监测能力;另一方面,拓展毒性分析能力[55],充分发挥生物监测在污染源监测、水体预警监测及新化学品安全性评估等方面的特殊作用。目前,发光菌、蚤类、斑马鱼已有标准分析方法,监测站在增加此类实验室分析能力的同时,还应发展一些有成熟方法的项目分析能力,包括 Ames 试验、微核试验等遗传毒性分析能力,藻类在线监测能力,以及生物体重金属及有机污染物分析能力。只有在具备以上生物监测能力的基础上,我国环境监测才能逐步构建水生态健康评价体系,在技术上支持环境保护从"污染防治"向"生态健康"转变。

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