Emerging Contaminant	Class	# Systems Studied	Min % Removal	Max % Removal	Avg % Removal
Bisphenol A	other	41	11	100	78
Caffeine	PPCP	7	85	100	94
Carbamazepine	PPCP	5	<10	60	22
DEET	pesti-cide	7	16	>84	54
Diclofenac	PPCP	23	7.1	>99	44
Estradiol	S/H	49	44	100	88
Estrone	S/H	46	1.8	100	77
Galaxolide	PPCP	25	9	99	56
Gemfibrozil	PPCP	13	38	>99	77
Ibuprofen	PPCP	32	43	100	90
Naproxen	PPCP	18	47	100	85
Nonylphenol	NP/ APEs	26	57	100	90
Sulfamethoxazole	PPCP	15	9	99	58
Tri(chloroethyl) phos-phate	other	2	4.5	50	27
Triclosan	PPCP	22	>67	100	89

What Can I Do?

Properly dispose of unused pharmaceuticals by following the specific disposal instructions that may be printed on the label or accompanying patient information. If no instructions are provided, contact your local physician and request information on proper disposal. Also, contact your State, County, or Local government about possible pharmaceutical take-back programs.

For more information on what you can do, visit:

- http://www.fda.gov/ForConsumers/ConsumerUpdates/ucm101653.htm
- http://www.epa.gov/ppcp/
- http://www.wef.org/PublicInformation/page.aspx?id=90

Above: Auburn's H. C. Morgan Water Pollution Control Facility discharges into Parkerson Mill Creek

Contact Information

For more information regarding your community's storm water program please contact the following agencies:

City of Auburn - Department of Water Resource Management
334-501-3077
www.auburnalabama.org/wrm

Lee County - County Engineer
334-737-7011
www.leeco.us

City of Opelika - Department of Public Works
334-705-5400
www.opelika.org

Auburn University - Risk Management and Safety
334-844-4805
www.auburn.edu/administration/rms/

City of Smiths Station -
334-297-8771
www.smithsstation.us

A Publication Presented by

ALOAS

Emerging Contaminants

Together Water
ALOAS
Working To Protect Resources

"Local Citizen Groups and Governments Working Together for Clean Water"

What Are Emerging Contaminants?

Emerging contaminants are chemicals that have recently been shown to occur widely in water resources and are identified as being a potential environmental or public health risk. However, adequate data is not yet available to determine this risk. Emerging contaminants include:

- Hormones and steroids
- Personal care products (fragrances, lotions, cosmetics, vitamins)
- Pharmaceuticals (over-the-counter drugs, prescriptions)
- Flame retardants
- Alkylphenols
- Pesticides

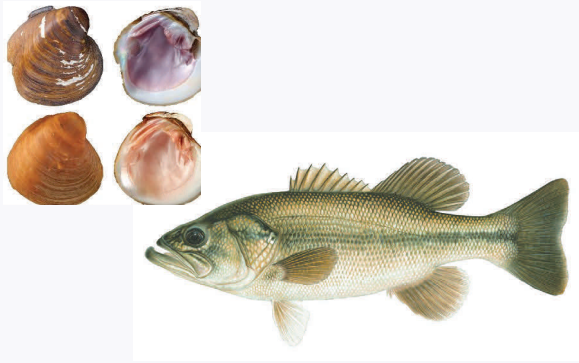
Pharmaceuticals and personal care products are collectively called PPCPs

Many of these contaminants enter municipal wastewater through bathing, cleaning, and laundry. The most common way for pharmaceuticals to enter the wastewater is by passing through the body.

What Are the Concerns?

Emerging contaminants are produced and used in large quantities and only some of these break down in the body or quickly degrade. Risks associated with these substances in the environment are unknown. So far scientists have not found evidence of direct adverse human health effects. However, effects on aquatic life are a major concern—exposure risks for aquatic organisms are much greater than those for humans due to continual and multi-generational exposure. These concerns include:

- Disruption of aquatic endocrine systems (the system of glands that produce hormones to control the body's metabolic activity) by natural and synthetic sex steroids
- Effects on spawning and other behaviors in shellfish from antidepressants
- Inhibition of sperm activity in certain aquatic organisms from calcium-channel blockers
- Antimicrobial resistance in microbes from the widespread use of antimicrobial chemicals
- Musk fragrances are bioaccumulative and persist in the environment



Emerging Contaminant Removal

Emerging Contaminant Class	Class Abbr.
Nonlyphenols, octylphenol, and alkylphenol ethoxylate (APEs) compounds	NP/APEs
Polynuclear aromatic hydrocarbons	PAH
Polybrominated biphenyl ethers	PBDEs
Pesticide	Pesticide
Pharmaceuticals and personal care products	PPCP
Steroids and Hormones	S/H
Other	Other

Municipal wastewater treatment facilities are not designed to specifically remove emerging contaminants from the wastewater. However, studies by the EPA indicate that some removal does occur with traditional practices including the activated sludge process employed by local facilities. Emerging contaminants may be removed from wastewater during activated sludge treatment by biodegradation and/or by adsorption to the solid material wasted from the system. The EPA's database suggests that the activated sludge process has an emerging contaminant removal efficiency ranging from 22% for carbamazepine (an ingredient in epilepsy medication) to 94% for caffeine—see chart on flap for a representative sample of 15 emerging contaminants.

For the complete listing, see the EPA's report "Treating Contaminants of Emerging Concern" available at http://water.epa.gov/scitech/swguidance/ppcp/results.cfm.