**ESCI 1301 Group Activity – Systems**

**Name of Your Group: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Group Members: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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***REMEMBER: Only put down the names of group members would are actually here today and participating!***

***This activity has both a group part and an individual part to it. Complete the individual part first before starting this part!***

***Group activity:***

*Why is the photograph showing a system?*

*Remember the key parts of a system – involves living and nonliving things, involves exchanges of matter and energy, has inputs and outputs.*

*Based on what you wrote on your individual activity sheets write down 4 living things you saw in the photo and 4 nonliving things that you saw in the space below. Discuss how these things might be related to one another – you may draw arrows or lines if you wish.*

*Answers vary see flow of matter and energy diagrams in book or biogeochemical cycles.*

*What is the function of one of the living things you have identified in the picture? What would happen if you took this thing away?*

*Answers vary – for example, if you took away the trees along the river the birds would lose a place to nest, other animals would lose a place to hide, a place to get shade from the sun, something to eat*

*What is the function of one of the nonliving things you have identified in the picture? What would happen if you took this thing away?*

*Answers vary - The water in the river is very important. Life in the photo would likely die without it.*

*How will matter flow in the system? Make a drawing of how you think it flows.*

*Look at figure in your book for examples of flow of matter*

*How will energy flow in the system? Make a drawing of how you think it flows.*

*Look at figure in your book for example of flow of energy*

*What feedback loops might exist in this system? Could you increase the input of something to the system and cause it to be unstable? What kind of feedback loop would that be?*

*Answers vary – if you increased amount of nitrogen in water (similar to book example of Chesapeake Bay) you would cause more algae to grow and that could lead to killing off fish and frogs. Something that increases input, speeds up the system (e.g. algae grows out of control) and causes instability is called “positive” feedback*

*What kind of feedback would you need to slow down the system or make it more stable? Can you give an example of how this would work for your system?*

*Answers vary - Limiting the amount of nitrogen (better farming practices) would help decrease amount of nitrogen and not lead to the growth of algae. Something that slows the system down, stabilizes it, keeps it from growing is called “negative”*

*What words did your group write down that were not just “things”. How do you think they relate to the system?*

*Answers vary – we will find there are many ecosystem services that aren’t just things – like many people like to walk along the river (recreational value) or explore the plants and animals that grow there (educational value)*

*If you came back and took a photo of this same place 100 years into the future what do you think would have changed?*

*Answers vary here – it all depends what you think the future holds for us!*

*If you had been able to take a photo of this place before the first Spaniards arrived in the region what do you think you would have seen?*

*Answers vary - You would find a lot more vegetation and animals. And the vegetation would be different. The river would not flow in one single channel (the river has been forced to flow in one channel by humans who don’t want floods).*