RASC DARK-SKY PRESERVE COMPLIANT LIGHTING
CGOL - Lighting with Low Ecological Impact

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General Appearance – Description by casual visitor
Lighting Design – Engineering Specifications for luminaire
Ecological Impact – Biological rationale for ecological integrity
Fixture Selection – Generally listed parameters for fixture selection
Installation – On-site installation requirements
Management – Programmatic benefits and Concerns

Customer	Shielding	Spectrum	Brightness[3]	Schedule
General Appearance	No up-light. No light beyond area of activity.	Amber colour. Easy on the eyes. Preserves night vision. Less attractive to flying insects.	Preserve night vision. Reduce reflected up-light. Reduce bright patch below fixture (good uniformity).	Turn off when not needed. Dim after hours.
Lighting Design	FCO or ShCO shielding. Add shields to non-shielded fixtures. Mount fixture level.	λ > 500 nm with Phosphor Converted LEDs, Narrow-band Amber LEDs, or use filters[1]. If light contains more than 2% <500 nm, use ShCO shielding and set to 40% CGOL brightness.	Roads - 3 lux (max). Parking Lots - 3 lux (max). Paths - 1 lux (max). Buildings - 3-lux (max). Uniformity better than 6:1 (max/ave[2]). Luminance per luminaire beyond illuminated area < 1 cd/m^2.	Timers turn off fixture at end of scheduled activity. Dimmers set to <50% after-hours when pedestrian traffic is still expected.
Ecological Impact	Limit contamination to only area of human activity. Keep foraging areas dark. Preserve animal night vision Do not enhance predator advantage.	Minimize attraction of flying insects. Minimize impact on aquatic species. Minimize distraction of migratory birds. Minimize loss of animal night vision. Reduce plant stress from seasonal change.	Minimize scattered light beyond area of activity. Maintain natural night beyond illuminated area. Discourage human activity in wildlife habitat.	Dim or turn off lights when nocturnal wildlife is foraging/hunting. Approximates and protects animal foraging period.
Fixture Selection	FCO or ShCO shields. After-market shields.	Use LEDs with CCT<2200K. Use amber “Bug Light” bulbs. Or, amber filter[1] over fixture window.	Paths - < 10 lumens/10m^2 Areas - < 300 lumens/100m^2 Roads/Parking Lots – <3 lux[2]	Programmable timers. Motion detectors. Dimmer controls.
Installation	Add shields to non-shielded fixtures. Mount fixture level.	Use amber “Bug Light” bulbs. Cover fixture window with amber filter[1].	Dimming allows standardized fixtures and lamps.	Set timer schedule to park “Dark Time”. Set dimmers to <50%.
Management	Preserves ecology mandate beyond activity area. Good activity-area lighting.	Creates more comfortable and restful night and environment for visitors. Market differentiation.	Low energy use enables solar power. Reduces cost of power infrastructure. Common equipment throughout park.	Lighting control budget. Reduced energy use. Enables solar power.

1. Roscolux #15 Deep Straw from www.bhphotovideo.com
2. Specifying maximum, not minimum illumination to encourage uniform illumination.
3. Reference IESNA RP-08 for low-density low-speed (local) traffic

FCO = Full Cut-Off
ShCO = Sharp Cut-Off
Amber = >500 nm