

平成 29 年 7 月 3 日

国際ダークスカイ協会
委員会メンバーの皆様

石垣市市長 中山 義隆



石垣市屋外照明管理計画について

石垣市では、ダークスカイ・パーク認定取得にあたり、別添のとおり「石垣市屋外照明計画」を制定しました。今後、認定候補区域内で本市が行う照明設置については、当計画に基づき、関係部署の調整の下行っていく所存ですので、ご査収ください。

Translation of page 25

**Light-scape Management Plan of Park Area
in Iriomote-Ishigaki National Park by Ishigaki City**

July 10, 2017

Committee Members
International Dark-Sky Association,

Dear IDA Committee Members,

Ishigaki city has enacted the Light-scape Management plan in the park area of Iriomote-Ishigaki National Park as written in the next page. Upon applying to acquire accreditation for “International Dark Sky Park”. Thereafter, it’s our sincere desire to manage the setting of the outdoor lighting within the planned area based on the Management plan by the department concerned.
(Please check details on the next page)

Sincerely yours,

Yoshitaka Nakayama
Ishigaki city Mayor
(with official seal)

Light-scape Management Plan of Park Area in Iriomote-Ishigaki National Park by Ishigaki City

Enactment Date: July 3, 2017

1. Purpose

Light-scape management plan in the park area as written below. Concerning the matters to set up and operate, should be considered for outdoor lighting, in order to maintain the quantity of light people need in daily living and minimize the light-pollution.

2. Coverage Area

The plan is for Ishigaki city to set up outdoor lighting within the planned area. Ishigaki-Iriomote National Park is the chosen area for the International Dark-Sky Park by International Dark-Sky Association, even outdoor lighting set up for personal needs within planned area are asked to cooperate based on Light-scape management.

3. Definition

I. Light-pollution cause the matters below.

- i. Less star can be seen in the night sky
- ii. Disrupts world ecosystems
- iii. Harms human health
- iv. Energy waste

II. Indoor lighting are light inside of buildings surrounded by wall and covered with roof. Outdoor lighting are all other lights outside used for night time movement such as flash light, headlight of bicycles, cars, and etc.

III. Upward luminous flux is a light towards the upper direction from the cover of the light that rise out from the outdoor lighting horizontally .However it does not include the reflected light on the surface of the ground and walls nearby.

4. The matter to be considered for setting and operation of outdoor lighting

Outdoor lighting generally should be turned on towards the direction where and when its needed the correlated color temperature should be lower than 3000 kelvins as much as possible.

4-I Direction of radiation

Outdoor lighting should be set up to 0 level of upward luminous flux and should not leak light out of citizen's living area as much as possible.

i. On areas without roof, use light equipment which covers the upper part of the light source (including covers that set around the light source such as prism, grooves, and covers that transmit light) to direct light downward upon setting up.

ii. On areas with roof, upward luminous flux should minimize leakage of light from the edge of the roof.

iii. The use of spotlight, searchlight, laser, etc., and internally illuminated light are generally prohibited for use, except on non-continuous use and case of 0 level of upward luminous flux.

iv. To minimize the leakage of the light to animal and plant habitat, and to avoid disturbing the pedestrian directly by causing glare on their eyes from light sources by setting the direction of lighting equipment using light-sealing board or covers..

4-II. Quantity of light

Only use light when needed, consider the kind of light sources, number of lights, and wattage for suitable amount of light to be used. Light adjuster or controller maybe used to control the lightings.

4-III. Lighting time

Usage of light according to purposes, only use in times needed, turn off or minimize the use of light as much as possible during unnecessary time.

i. Turn off the light and minimize the use of light to be adjusted by park caretaker, by using motion sensor lights, and timer.

ii. Outdoor lighting of facilities and shops should be turned off during closing time.

4-IV. Color temperature

Except on special purpose, the correlated color temperature for sources of light should be lower than 3000 kelvins, and upon considering the places where it affects animals and plants it should be lowered to 2000 kelvins.

- Upon meeting all the matters above, appropriate use of lighting and equipment for excellent efficiency of energy can be achieved

5. Limit leakage of light from indoor lighting

In case of using large amounts of light and indoor lighting in facilities, use light sealing materials such as curtains, blinder, amado(storm-shutter)and etc., to minimize the leakage of light outside.

**Light-scape Maintenance Standard and
Management Plan of Public Facilities in Taketomi Town,
Review Board Guideline**

Official Instruction No.27, July1, 2017

Establishment

Article 1. Outdoor lighting in public facilities maintained by Taketomi town, in order to secure the light for daily need of people in night and minimize light pollution, Taketomi town established the review board for Light-scape maintenance standard and management plan of public facilities in Taketomi town.

Matters to be considered

Article 2. The review board considers the matter written below

- i. Light-scape maintenance standard and management plan of public facilities in Taketomi town.
- ii. Light-scape maintenance standard and management plan of public facilities in other area of Taketomi town.

Organization

Article 3. Review board organizes with the chairman, vice chairman and the committee.

3-II. To assign the chairman as a director for policy coordination, and the Vice chairman as the policy promotion section chief.

3-III. Committee members organizes with the community development section chief, Industry promotion chief, Town section manager, Director of Education Board.

3-IV. Chairman assign the person in addition to who it may concern related to the matter when it's necessary aside from the committee members in the provisions of the preceding paragraph.

Task for chairman

Article 4. The chairman shall preside over affairs of the review board and representative of the board.

4-II. The vice chairman shall assist the chairman in directing the functions, and act on behalf of the chairman when he/she is unable to attend to his/her duties.

Meeting

Article 5. A Chairman convenes the meeting

5-II. The board may not hold a meeting unless the number of attendees meet a certain amount.

5-III. When it is necessary, the chairman may demand the attendance of a person aside from the committee members and can hear the opinion and explanation from them.

General affairs

Article 6. Handling of the General Affairs of Review Board in policy promotion section.

Commission

Article 7. In addition to those specified in this act, procedures of meetings and other necessary matters concerning the administration of the board shall be determined by the committee members.

Supplementary provisions

This official instruction takes effect from July 1, 2017.

Light-scape Maintenance Standard and Management Plan of Public Facilities by Taketomi Town

Purpose

Article 1: Light-scape management plan in the park area as written below. Concerning matters to set up and operate, should be considered for outdoor lighting, in order to maintain the quantity of light people need in daily living and minimize light-pollution.

Coverage areas

Article 2 : This Plan is for Taketomi town to set up outdoor lighting within the planned area which is Ishigaki-Iriomote National Park.

2-II: Even outdoor lightings set up for personal needs within planned area asks for cooperation based on the light-scape management plan

Definition

Article 3 : Light-pollution causes the matters below.

- i. Less stars can be seen in the night sky
- ii. Disrupts world's ecosystem
- iii. Harms human health
- iv. Waste energy

Article 4 : Indoor lighting are lights inside of buildings surrounded by wall and covered by a roof. Outdoor lighting are all other lighting.

Article 5 : Upward luminous flux is a light towards the upper direction from the cover of the light that rise out from the outdoor lighting horizontally. However it does not include the reflected light on the surface of the ground and walls nearby.

The matters to be considered

Article 6 : Outdoor lighting generally should be turned on towards the direction where and when it is needed, The correlated color temperature should be lower than 3000 kelvins as much as possible.

Article 7 : About the direction of radiation for outdoor lightings it should be set up to 0 level of the upward luminous flux and should not leak light out of citizen's living area .

7-II: On areas without roof, use lighting equipment which covers the upper part of the light source (including covers that set around the light sources such as prism, grooves, and covers that transmit light) to direct light downward upon setting up.

7-III: On areas with roof, upward luminous flux should minimize leakage of

light from the edge of the roof.

7-IV: To use spotlight, searchlight, laser, etc., and internally illuminated light are generally prohibited for use, except on non-continuous usage and in case of 0 level of upward luminous flux.

7-V: To minimize the leakage of the light to animal and plant habitat, and to avoid disturbing the pedestrian directly by causing glare on their eyes from light sources by setting the direction of lighting equipment using light-sealing board or covers.

Article 8 : Quantity of light should only be used accordingly, considering the kind of light sources, number of lights , and wattage for suitable amount of light to be used.

8-II: Light adjuster or controller maybe used to control the lightings

Article 9 : Lights should be only used in times of need, and should be turned off or lowered during unnecessary time as much as possible

9-II: Turn off the light and minimize the use of light to be adjusted by park caretaker, by using motion sensor lights, and timer.

9-III: Outdoor lighting of facilities and shops should be turned off during closing time.

Article 10 : Color temperature of the light source should be lower than 3000 kelvins, , except on special purpose.

10-II: upon considering places that affects animals and plants it should be lowered to 2000 kelvins.

Article 11 : Upon meeting all the matters above Article 1to10 the appropriate use of lighting and equipment for excellent efficiency of energy

Limit leakage of light from indoor lighting

Article12 : In case of using large amounts of light and indoor lighting in facilities, use light sealing materials such as curtains, blinder, amado(storm-shutter),and etc. to minimize the leakage of light outside.

Period

Article 13 : Taketomi Town aims to finish the improvement of all public outdoor lighting in the planned area to be compliant with the park's LMP within five years from the start of the retrofitting project.

13-II: The compliance rate of each year is 10% for the first year, 20% for the second year, 25% for the third year, 35% for the fourth year and 10% for the fifth year, which will result in the 100% total compliance rate after the five years.

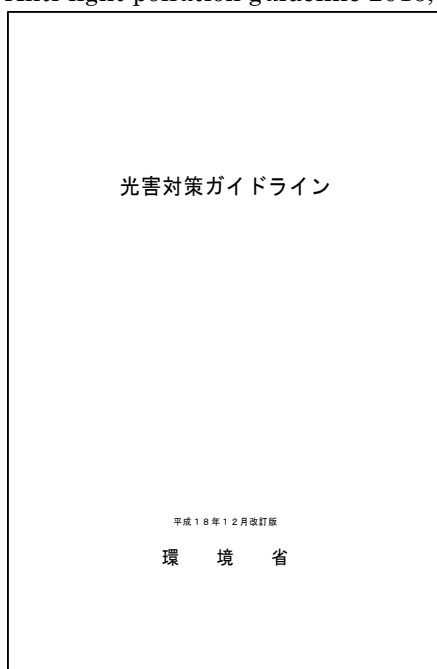
Anti-Light Pollution Measurement

by the Ministry of Environment

The Ministry of Environment which appointed Iriomote-Ishigaki National Park has formulated a “Guideline of Anti-Light pollution “for the purpose of contributing to the prevention of global warming by the formation of good light environment planned the adequacy of the outdoor lighting since 1998. After that “Hand book plan for Anti-light pollution in community outdoor lighting environment”, “Guidebook which affects the prevention of light pollution system” summarized and coordinated successfully, and it was conjugated by the prevention of Light pollution measure such as the local public entity and brought raising awareness and prevention effect of Light pollution to the concern citizens in many aspects

After 8 years of development the degree of social request for prevention of pollution increased, and also the recognition for pollution diversified. On the other hand, the obstacle photo inhibition guided by the CIE (Commission Internationale de l’Éclairage) is newly announced, and the movement accelerated globally. In addition, the update from the city formed from the period of the high growth of economy is important to have a better environment pointed out. Based on these things, the 2006 guidelines have been revised and updated.

Anti-light pollution guideline 2016, Dec. revised edition



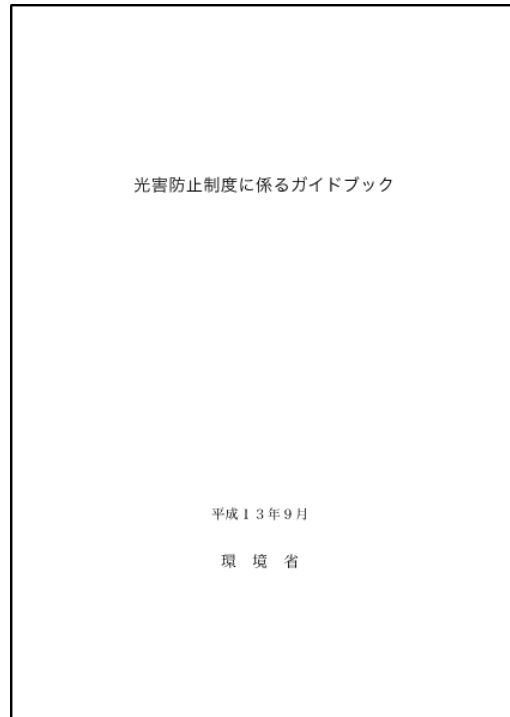
Content

1. Definition of light pollution
 - 1-1 Definition of light pollution
 - 1-2 Environment influenced by artificial lighting
 - 1-3 Definition of the related term
2. Guideline of the outdoor lighting
 - 2-1 Guide for the outdoor lighting equipment
 - 2-2 Check list for the outdoor lighting equipment
 - 2-3 Handling of billboard lighting
3. Environmental creation for local purposes
4. How to use the guideline
 - About the term abbreviation sign

Hand book plan for Anti-light pollution in outdoor-lighting environment”



Guide-book which affects a prevention of light-pollution system



Pamphlet for Anti-light pollution and awareness



Poster for Anti-light pollution awareness



Pamphlet of Anti-Light pollution (green lighting) Campaign

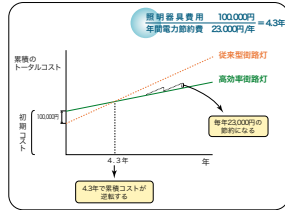
照明機器の改修による効果の事例



- 不快なまぶしさや上空への無駄な光が多い透明グローム灯を上方光束が5%未満の道路灯に改修。
 - ・路面の明るさの向上
 - ・上空へ漏れる光の大幅削減
 - ・不快なまぶしさの大幅低減
 - ・57%の省エネを達成 (年間電力料金23,000円の節約！)

評価項目	改修前	改修後	効果	
もれ光	50.0	3.7	93%削減	
グレア	照明器具の輝度 (cd/m ²)	9,540	790	1/12に削減
照明効率	路面の照度 (lx)	1.4	7.3	約5倍
省エネ	入力電力 (W)	435	185	57%削減
	総合効率 (lm/W)	50.6	54.1	7%増加
	年間電力 (円)	40,020	17,020	57%削減 (※電圧200V90W)

適切な照明機器の設置は、経費節減にもつながります！



上方光束比を非常に高く抑えた、新しいデザインの道路灯は、従来のグローム灯に比べ、初期費用は高くなりますが、省エネルギー性の高さにより、その後の電力費の低減が可能となり、初期費用のコスト高分を回収することが可能です。

仮に、新型の道路灯が、従来型に比べて、初期費用が100,000円高くなったとしても、年間電力費が3,000円節約できるなら、約4年で費用が回収できることがわかります。4年経過後は、維持経費の節約となります。

環境庁 大気保全局 大気生活環境室
環境庁ホームページ <http://www.aic.or.jp/>

本誌版は年300万回再生を使用しています

平成12年11月

良好な照明環境を目指して！

ひかりがい 光害の防止のために

一屋外における照明器具の設置にあたっては、周辺環境への配慮が求められています。



光害（ひかりがい）とは？

屋外照明器具から発する光のうち、目的の照明範囲の外に漏れる光によって起こる、様々な悪影響を「光害（ひかりがい）」といいます。

屋外照明が周辺環境へ及ぼす影響としては居住者、運転者、歩行者への不快な影響および動植物への悪影響、夜空の明るさへの影響などがあります。

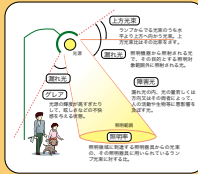


環境に配慮した屋外照明設置のポイント

1

適切な照明機器の選定

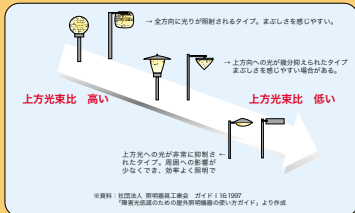
(環境に配慮した屋外照明を実現するためには、適切な照明機器の選定が重要です)



- 照らす範囲を効率よく照明できる照明器具を選定
- 上方へ漏れる光が少ない照明器具を選定
- 不快なまぶしさや空への照明器具を選定
- 省エネルギー性の高い照明器具を選定

※上記のポイントを考慮した照明器具が製品化されています。詳細は、各照明器具メーカーにお問い合わせください。

主な照明用語の解説



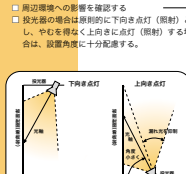
街路灯の形状と特徴

※資料：社団法人 照明器具工業会 〒101-8197 東京都港区赤坂1-1-1 赤坂ビル5階

2

周辺環境へ配慮した設置

(屋外照明の設置に際しては、以下のような配慮が重要です)



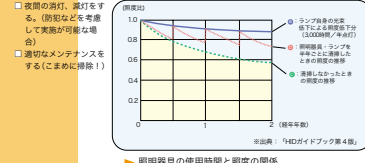
画面に近い面への投光照明方法

- 周辺環境への影響を確認する
 - 投光器の場合は照射的に下向き点灯 (照射) とし、やむを得なく上向き点灯 (照射) する場合は、設置角度に十分配慮する。
- チェック
- 上方へ光が無駄に漏れていないか。
 - 歩行者・運転者の目に直接光線が強く当たらないか。
 - 運転者 (自動車、自転車) が歩行者の視認に障害を生ずる可能性はないか。
 - 信号、交通標識等に光が当たる可能性はないか。
 - 対面の居住施設等の住居者の目に直接、光が強く当たらないか。(居住者への睡眠等の生活の妨げになる可能性はないか。)
 - 天文観測などに行われるか。
 - 農作物などに対し直接、光が強く当たらないか。
 - 野生動物が生息している地域に隣接していないか。

3

照明機器の適切な管理 (点灯管理・メンテナンス)

(効率的なエネルギー利用のために、適切な保守管理が重要です)



照明器具の使用時間と照度の関係